



SERVICE MANUAL

Model Series:

Product Type: Projection TV
Chassis: ZP94/ZP95
Manual Series: PV152
Manual Part #: 923-03439
Model Line: C
Product Year: 2000

IQC60H94W
IQC50H94W
IQC60H95W
IQC50H95W

CONTENTS

General Information.....	1
Servicing/Troubleshooting.....	2
Circuit Description.....	3
Model Parts Lists	4
Exploded Views	5
PCB Layouts	6
Schematics	7

Published by Technical Publications
Zenith Electronics Corporation
201 James Record Road - Huntsville, Alabama 35824-1513

©Copyright July 2000 by Zenith Electronics Corporation

PRODUCT SAFETY SERVICING GUIDELINES FOR AUDIO-VIDEO PRODUCTS

IMPORTANT SAFETY NOTICE

This manual was prepared for use only by properly trained audio-visual service technicians.

When servicing this product, under no circumstances should the original design be modified or altered without permission from Zenith Electronics Corporation. All components should be replaced only with types identical to those in the original circuit and their physical location, wiring and lead dress must conform to original layout upon completion of repairs.

Special components are also used to prevent x-radiation, shock and fire hazard. These components are indicated by the letter "x" included in their component designators and are required to maintain safe performance. No deviations are allowed without prior approval by Zenith Electronics Corporation.

Circuit diagrams may occasionally differ from the actual circuit used. This way, implementation of the latest safety and performance improvement changes into the set is not delayed until the new service literature is printed.

CAUTION: Do not attempt to modify this product in any way. Never perform customized installations without manufacturer's approval. Unauthorized modifications will not only void the warranty, but may lead to property damage or user injury.

Service work should be performed only after you are thoroughly familiar with these safety checks and servicing guidelines.

GRAPHIC SYMBOLS



The exclamation point within an equilateral triangle is intended to alert the service personnel to important safety information in the service literature.



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the service personnel to the presence of noninsulated "dangerous voltage" that may be of sufficient magnitude to constitute a risk of electric shock.



The pictorial representation of a fuse and its rating within an equilateral triangle is intended to convey to the service personnel the following fuse replacement caution notice:

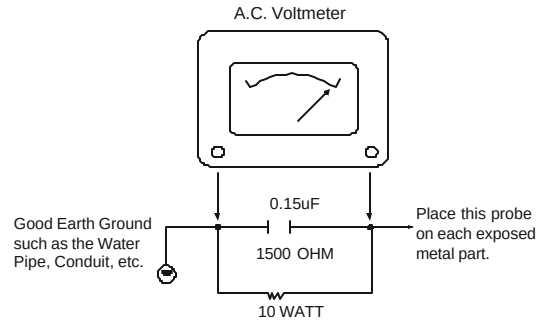
CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ALL FUSES WITH THE SAME TYPE AND RATING AS MARKED NEAR EACH FUSE.

SERVICE INFORMATION

While servicing, use an isolation transformer for protection from AC line shock. After the original service problem has been corrected, make a check of the following:

FIRE AND SHOCK HAZARD

1. Be sure that all components are positioned to avoid a possibility of adjacent component shorts. This is especially important on items transported to and from the repair shop.
2. Verify that all protective devices such as insulators, barriers, covers, shields, strain reliefs, power supply cords, and other hardware have been reinstalled per the original design. Be sure that the safety purpose of the polarized line plug has not been defeated.
3. Soldering must be inspected to discover possible cold solder joints, solder splashes, or sharp solder points. Be certain to remove all loose foreign particles.
4. Check for physical evidence of damage or deterioration to parts and components, for frayed leads or damaged insulation (including the AC cord), and replace if necessary.
5. No lead or component should touch a receiving tube or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces must be avoided.
6. After reassembly of the set, always perform an AC leakage test on all exposed metallic parts of the cabinet (the channel selector knobs, antenna terminals, handle and screws) to be sure that set is safe to operate without danger of electrical shock. **DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST.** Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner: Connect a 1500 ohm, 10 watt resistor, paralleled by a .15 mfd 150V AC type capacitor between a known good earth ground water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and .15 mfd capacitor. Reverse the AC plug by using a non-polarized adaptor and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.75 volts RMS. This corresponds to 0.5 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



X-RADIATION

1. Be sure procedures and instructions to all service personnel cover the subject of x-radiation. The only potential source of x-rays in current TV receivers is the picture tube. However, this tube does not emit x-rays when the HV is at the factory-specified level. The proper value is given in the applicable schematic. Operation at higher voltages may cause a failure of the picture tube or high-voltage supply and, under certain circumstances may produce radiation in excess of desirable levels.
2. Only factory-specified CRT anode connectors must be used.
3. It is essential that the service personnel have available an accurate and reliable high-voltage meter.
4. When the high-voltage circuitry is operating properly, there is no possibility of an x-radiation problem. Every time a color Chassis is serviced, the brightness should be run up and down while monitoring the high voltage with a meter, to be certain that the high voltage does not exceed the specified value and that it is regulating correctly.
5. When troubleshooting and making test measurements in a product with a problem of excessively high voltage, avoid being unnecessarily close to the picture tube and the high voltage power supply. Do not operate the product longer than necessary to locate the cause of excessive voltage.
6. Refer to HV, B+, and shutdown adjustment procedures described in the appropriate schematics and diagrams (where used).

IMPLOSION

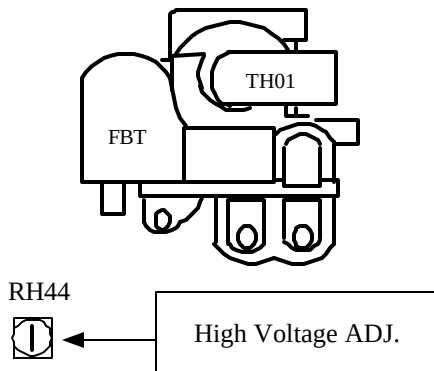
1. All direct view picture tubes are equipped with an integral implosion protection system; take care to avoid damage during installation.
2. Use only the recommended factory replacement tubes.

TIPS ON PROPER INSTALLATION

1. Never install any receiver in a closed-in recess, cubbyhole, or closely fitting shelf space over, or close to, a heat duct, or in the path of heated air flow.
2. Avoid conditions of high humidity such as: outdoor patio installations where dew is a factor, near steam radiators where steam leakage is a factor, etc.
3. Avoid placement where draperies may obstruct venting. The customer should also avoid the use of decorative scarves or other coverings that might obstruct ventilation.
4. Wall- and shelf-mounted installations using a commercial mounting kit must follow the factory-approved mounting instructions. A product mounted to a shelf or platform must retain its original feet (or the equivalent thickness in spacers) to provide adequate air flow across the bottom. Bolts or screws used for fasteners must not touch any parts or wiring. Perform leakage tests on customized installations.
5. Caution customers against mounting a product on a sloping shelf or in a tilted position, unless the receiver is properly secured.
6. A product on a roll-about cart should be stable in its mounting to the cart. Caution the customer on the hazards of trying to roll a cart with small casters across thresholds or deep pile carpets.
7. Caution customers against using a cart or stand that has not been listed by Underwriters Laboratories, Inc. for use with its specific model of television receiver or generically approved for use with TVs of the same or larger screen size.
8. Caution customers against using extension cords. Explain that a forest of extensions, sprouting from a single outlet, can lead to disastrous consequences to home and family.

CHASSIS HIGH VOLTAGE ADJUSTMENT PROCEDURE

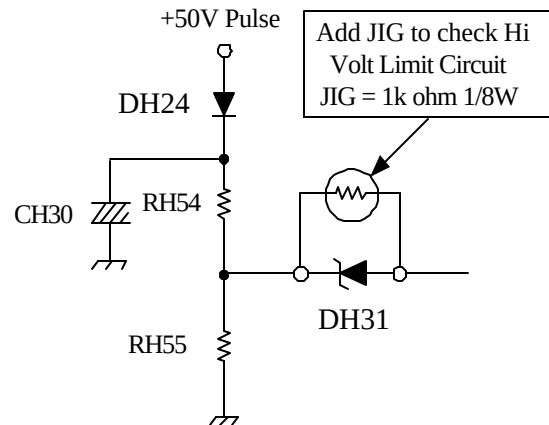
1. Connect High Voltage meter to FBT High Voltage output. Connect Ground of High Voltage meter to CRT Ground or FBT Ground.
2. Check that the High Voltage adjustment VR (RH44) is set to it's mechanical center on the Deflection PWB. This VR is located just behind the Flyback transformer as viewed from the Front of the set. (See diagram below)
3. Receive an NTSC generator signal. (Picture should be stationary for this adjustment.
4. Video Controls should be set to Factor Settings.
5. Adjust the High Voltage to the following specifications by turning RH44 slowly.
6. Lock Paint the control. If available.



CHASSIS HIGH VOLTAGE LIMITER CHECK

Check Preparation:

1. The set can face any direction.
2. Receive the Cross-Hatch Signal
3. **VIDEO CONTROLS:** Brightness to Maximum.
4. **SCREEN FORMAT:** Should be **PROGRESSIVE** mode.
5. Attach the JIG (1k ohm 1/8W resistor) to both ends of DH31 as shown in the diagram below. (See Diagram Below)



Checking Procedure :

1. Check that the picture is turned off and the horizontal deflection circuit stops operation.

After Checking:

1. Unplug set and Remove Jig. Allow set to remain in the off condition for at least 15 seconds.
2. Apply AC and confirm the set returns to normal operation.

CHASSIS FLYBACK PROTECTION CIRCUIT CHECK

Check Preparation:

1. The set can face any direction.
2. Receive the Cross-Hatch Signal
3. **VIDEO CONTROLS:** Factory Preset.
4. **SCREEN FORMAT:** Should be **PROGRESSIVE** mode.
5. Attach a 100 K ohm 1/16W ~ 1/8W resistor between QP02 base and Gnd. (SD4 connector Pin 4) and check operation.

After Checking:

1. Unplug set and Remove Jig. Allow set to remain in the off condition for at least 15 seconds.
2. Apply AC and confirm the set returns to normal operation.

CHASSIS SWEEP LOSS DETECTION CIRCUIT CHECK

Check Preparation:

Check Number (1):

1. The set can face any direction.
2. Receive the Cross-Hatch Signal
3. **VIDEO CONTROLS:** Factory Preset.
4. **SCREEN FORMAT:** Should be **PROGRESSIVE** mode.
5. Attach the JIG (A) (100 ohm 1/8W resistor) to right hand side of RN01 and to Ground as shown in the diagram below.

Check Number (2):

1. The set can face any direction.
2. Receive the Cross-Hatch Signal
3. **VIDEO CONTROLS:** Factory Preset.
4. **SCREEN FORMAT:** Should be **PROGRESSIVE** mode.
5. Attach the JIG (B) (100 ohm 1/8W resistor) to right hand side of RN11 and to Ground as shown in the diagram below.

Checking Procedure :

1. Check that the picture is turned off in either check.

After Checking:

1. Remove Jig after each check.
2. Confirm the set returns to normal operation.

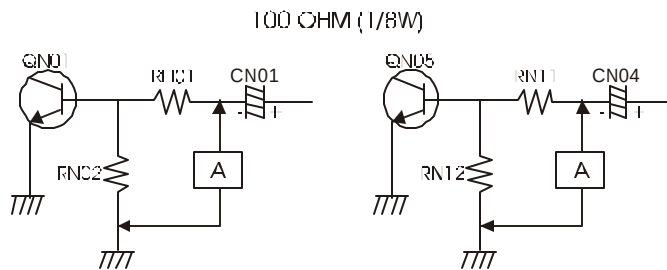


TABLE OF CONTENTS

SECTION 1 GENERAL INFO / REMOTE CONTROL

CAUTIONS FOR HV CONNECTOR	1-1
SPECIFICATIONS	1-2
GENERAL INFORMATION	1-3
REMOTE	1-4
REMOTE CODES	1-5
CUSTOMER AUDIO/VIDEO ADJUSTMENT	1-7
CUSTOMER CONVERGENCE ADJUSTMENT	1-9

SECTION 2 SERVICING

SERVICE MENUES	2-1
SERVICE ADJUSTMENT ORDER	2-6
MEMORY INITIALIZATION	2-7
PRE HEAT	2-7
CUT OFF ADJUSTMENT	2-7
PRE FOCUS ADJUSTMENT	2-7
DCU PHASE ADJUSTMENT (COARSE)	2-9
HORIZONTAL PHASE ADJUSTMENT	2-9
RASTER INCLINATION	2-9
BEAM ALIGNMENT	2-10
VERT/HORIZ POSITION ADJUSTMENT	2-10
HORIZONTAL SIZE ADJUSTMENT	2-11
VERTICAL SIZE ADJUSTMENT	2-11
BEAM FORM ADJUSTMENT	2-11
LENS FOCUS ADJUSTMENT	2-12
STATIC FOCUS ADJUSTMENT	2-12
BLUE DEFOCUS ADJUSTMENT	2-12
WHITE BALANCE ADJUSTMENT	2-13
SUB BRIGHT ADJUSTMENT	2-14
HORIZONTAL POSITION ADJUSTMENT (FINE)	2-14
DIGITAL CONVERGENCE ADJUSTMENT	2-14
DIGITAL CONVERGENCE REMOTE	2-15
CONVERGENCE POINT ADJUSTMENT	2-16
CONVERGENCE 3X3 ADJUSTMENT	2-17
CONVERGENCE 7X5 ADJUSTMENT	2-17
CONVERGENCE 13X9 ADJUSTMENT	2-17
TROUBLE SHOOTING	2-19

SECTION 3 CIRCUIT DESCRIPTION

POWER SUPPLY OPERATION	3-1
TURNING ON THE DEFLECTION POWER SUPPLY	3-2
POWER SUPPLY SHUTDOWN EXPLANATION	3-3
ABL CIRCUIT	3-4
MICRO PROCESSOR DATA COMMUNICATION	3-5

SECTION 4 PARTS LIST

MODEL PARTS	4-1
-------------------	-----

SECTION 5 DIAGRAMS

ZP 94/95 EXPLODED VIEW	5-1
ZP 94/95 EXPLODED VIEW FRONT	5-2
ZP 94/95 EXPLODED BACK	5-3
ZP 94/95 INTERCONNECT	5-4
ZP 94/95 WIRING DIAGRAM	5-5

SECTION 6 PCB LAYOUTS

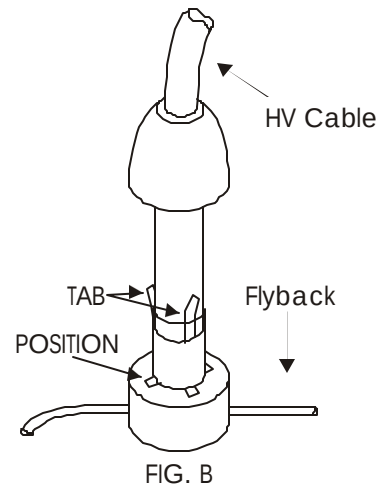
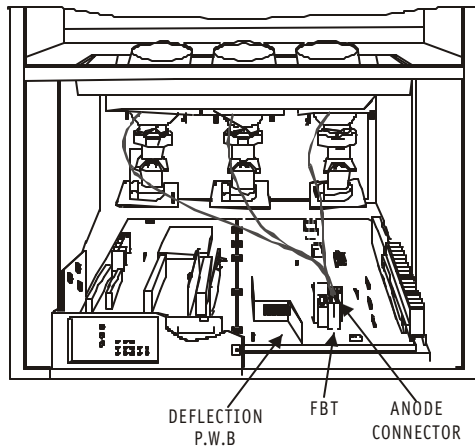
ZP 94/95 DEFLECTION TOP PCB LAYOUT	6-1
ZP 94/95 DEFLECTION BOTTOM PCB LAYOUT	6-2

ZP 94/95 SIGNAL TOP PCB LAYOUT	6-3
ZP 94/95 SIGNAL BOTTOM PCB LAYOUT	6-4
ZP 94/95 SWITCH MODE POWER TOP PCB LAYOUT	6-5
ZP 94/95 SWITCH MODE POWER BOTTOM PCB LAYOUT	6-6
ZP 94/95 CPT TOP PCB LAYOUT	6-7
ZP 94/95 CPT BOTTOM PCB LAYOUT	6-8
ZP 94/95 SRS AUDIO TOP PCB LAYOUT	6-9
ZP 94/95 SRS AUDIO BOTTOM PCB LAYOUT	6-10
ZP 94/95 JACKPACK TOP PCB LAYOUT	6-11
ZP 94/95 JACKPACK BOTTOM PCB LAYOUT	6-12
ZP 94/95 CONTROL PANEL TOP PCB LAYOUT	6-13
ZP 94/95 CONTROL PANEL BOTTOM PCB LAYOUT	6-14
ZP 94/95 VELOCITY MODULATOR AND SUB TOP PCB LAYOUT	6-15
ZP 94/95 VELOCITY MODULATOR AND SUB BOTTOM PCB LAYOUT	6-16
ZP 94/95 YC & COMB FILTER TOP PCB LAYOUT	6-17
ZP 94/95 YC & COMB FILTER BOTTOM PCB LAYOUT	6-18

SECTION 7 SCHEMATICS

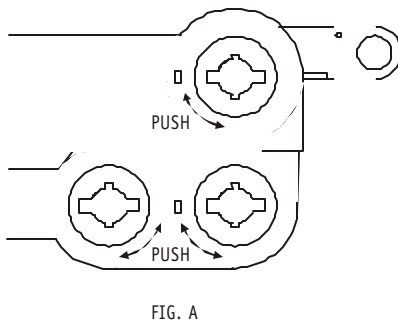
ZP 94/95 MICRO PWB CIRCUIT	6-1
ZP 94/95 SIGNAL INTERCONNECT CIRCUIT	6-2
ZP 94/95 TUNER IF CIRCUIT	6-3
ZP 94/95 POWER SUPPLY PWB CIRCUIT	6-4
ZP 94/95 DEFLECTION CIRCUIT	6-5
ZP 94/95 CONVERGENCE POWER SUPPLY	6-6
ZP 94/95 REGISTRATION / CONVERGENCE CORRECT PWB ...	6-7
ZP 94/95 JACKPACK / TERMINAL DIAGRAM	6-8
ZP 94/95 2 LINE COMB FILTER CIRCUIT	6-9
ZP 94/95 CHROMA / LUMMA CIRCUIT	6-10
ZP 94/95 VELOCITY MODULATOR PWB CIRCUIT	6-11
ZP 94/95 CRT PWB CIRCUIT	6-12
ZP 94/95 AUDIO MATRIX / CONTROL PANEL PWB	6-13

CAUTIONS WHEN CONNECTING / DISCONNECTING THE HV CONNECTOR



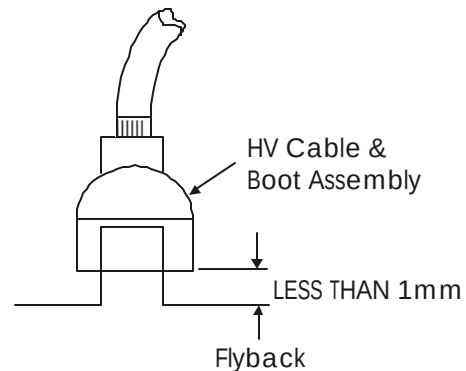
Perform the following when the HV connector (anode connector) is removed or inserted for CPT replacement, etc.

3. Remove the connector slowly by pulling it away from the case.



During Removal

1. Roll out silicon cover from FBT's contact area slowly.
2. While turning the connector about 90 degrees following the arrow (0 position). Push the connector slightly toward the case. (Fig. A)



During Insertion

1. Please refer to direction for insertion as shown in Fig. B (L position). Insert connector until "CLICK" sound is heard.
2. Make sure the connector is pressed right in, so that it has a good contact with the spring.
3. Confirm the contact by pulling the connector slightly. (Don't pull hard because it may damage the connector).
4. Cover the high voltage output by carefully pushing silicon boot onto it. (Don't turn the connector).

Note: Make sure the silicon boot is covering the high voltage output.

TECHNICAL CAUTIONS

High Voltage limiter circuit check

1. Turn off TV and connect jig as shown in Figure 2.
Adjust jig fully counter clockwise for minimum resistance.
2. Set the AC input to 120V AC and turn on TV.
3. Confirm test pattern on CRT is a usable picture, then slowly adjust jig until the picture disappears and TV shuts down.
4. When the limiter circuit is operating properly, Voltage will be less than 36.5kV at 0.6mA when TV shuts down.
5. Turn off set immediately after checking circuit operations.
6. Unplug set for one minute to reset shutdown circuit.
Remove jig and voltmeter.

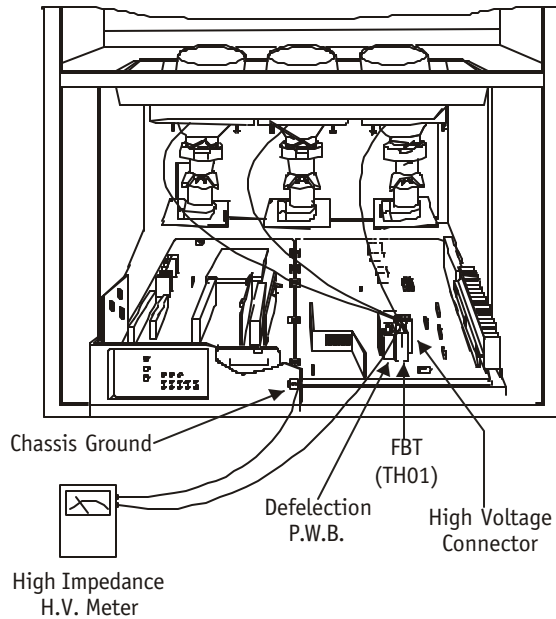
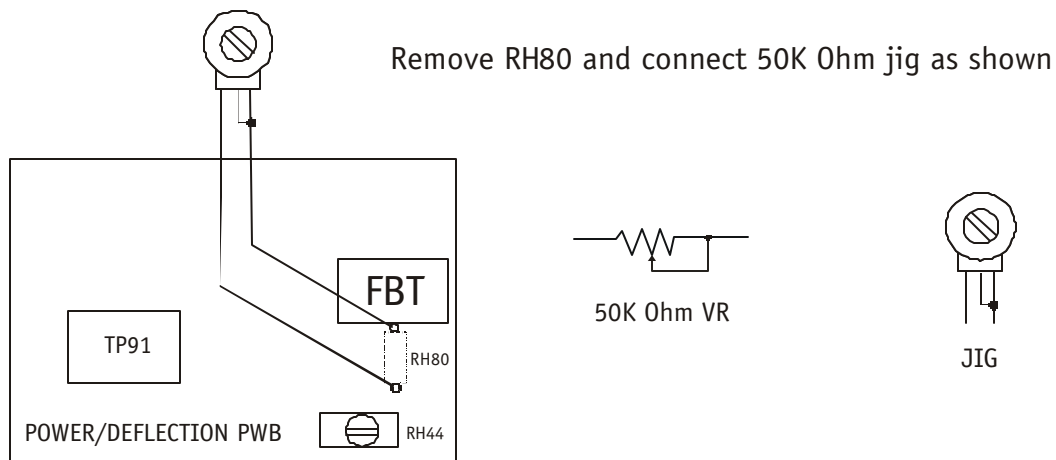


Figure 2. Deflection/Power PCB

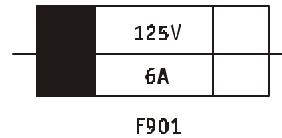
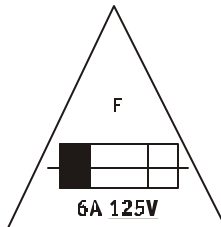


SPECIFICATIONS FOR 94 & 95 SERIES MODELS

Model:	IQC60H95W IQC50H95W IQC60H94W IQC50H94W		Audio Input:	470 mVrms, 47 k Ohm	
Cathode-Ray Tube:	R=P16LFM00RFA(LU) G=P16LFM00HHA(LU) B=P16LFM00BMB(EU)		Stereo Audio Output:	470 mVrms, 1 k Ohm	
Power Input	120 Volt AC, 60Hz		Audio Output Power:	Front- 12 Watt at 10% distortion, 8 Ohm Imp. Max Output - 15 Watt	
Power Consumption:	ZP94 224 Watts - Maximum 192 Watts - Operating	ZP95 232 Watts - Maximum 206 Watts - Operating	Anode Voltage:	30.0 ± 1.5kv (1.27 ± 0.2ma)	
Antenna Impedence:	75ohm Unbalanced VHF / UHF / CATV		Brightness	Size	ZP94 ZP95
Receiving Channel:	BAND	CH	Full White	50"	130 130
	VHF	2-13	Brightness Max	60"	100 100
	UHF	14-69	Speakers:	2 woofers - 5 Inch (12 cm) Round	
	EXT. Mid	(A-5)~(A-1), 4+	Dimension:	50" Series Models	60" Series Models
	CATV Mid	A~I	Height	52	60 1/2
	CATV Super	J~W	Width	43 1/5	51 1/2
	CATV Hyper	(W+1) (W+28)	Depth	23 1/2	26 1/2
			Weight		
Intermediate Frequency:	Picture I-F Carrier 45.75 MHz Sound I-F Carrier 41.25 MHz Color Sub Carrier 42.17 MHz		Circuit Board Assemblies:	Power Supply P.W.B.	C.P.T. (B) P.W.B Control P.W.B
Video Input:	1 Volt p-p, 75 Ohm 1 Volt p-p, 75 Ohm (Y) 07. Volt p-p, 75 Ohm, (Cb, Cr)			VM P.W.B.	C.P.T. (G) P.W.B. Sensor Dist. P.W.B.
Video Output:	1 Volt p-p, 75 Ohm			Surround P.W.B.	C.P.T. (R) P.W.B. Sub Deflect. P.W.B
				Signal P.W.B.	Power/Deflection P.W.B.
				Audio Out P.W.B.	Control P.W.B.
				2H P.W.B.	Terminal P.W.B.

CIRCUIT PROTECTION

EXAMPLE



CAUTION:

Below is an EXAMPLE only. See Replacement Parts List for details. The following symbol near the fuse indicates fast operation fuse (to be replaces). Fuse ratings appear within the symbol.

"RISK OF FIRE - REPLACE FUSE AS MARKED"

The rating of fuse F901 is 6.0A - 125V.
Replace with the same type fuse for continued protection against fire.

GENERAL INFORMATION

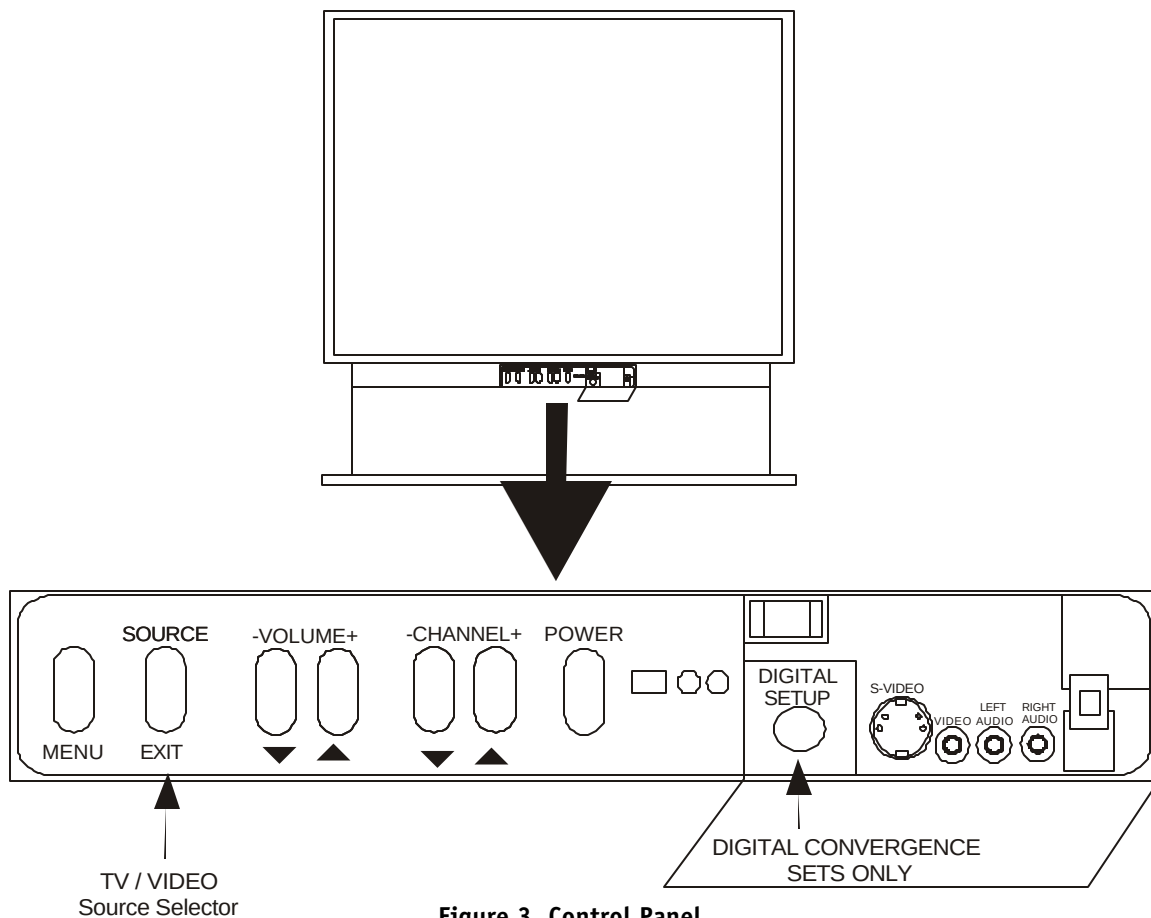


Figure 3. Control Panel

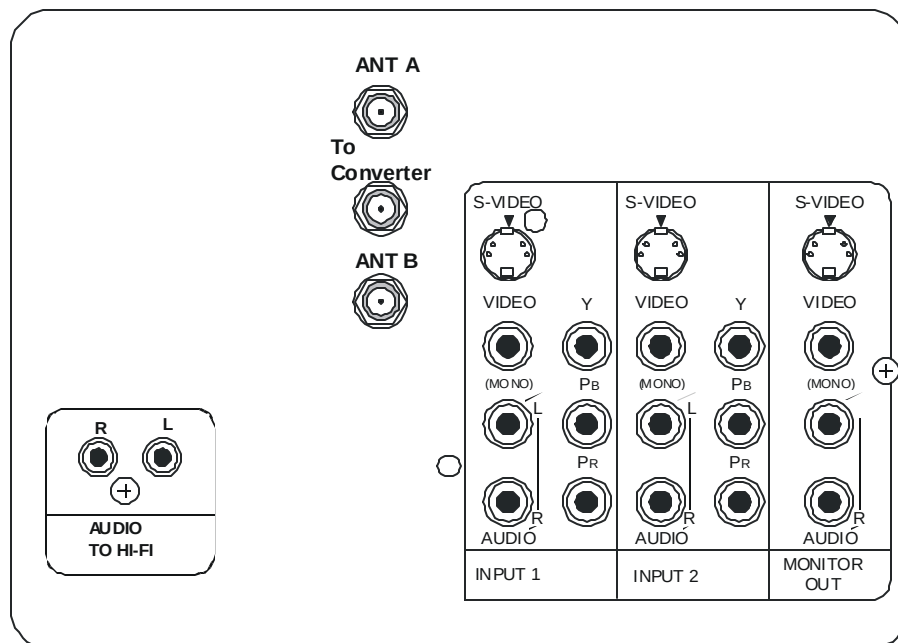
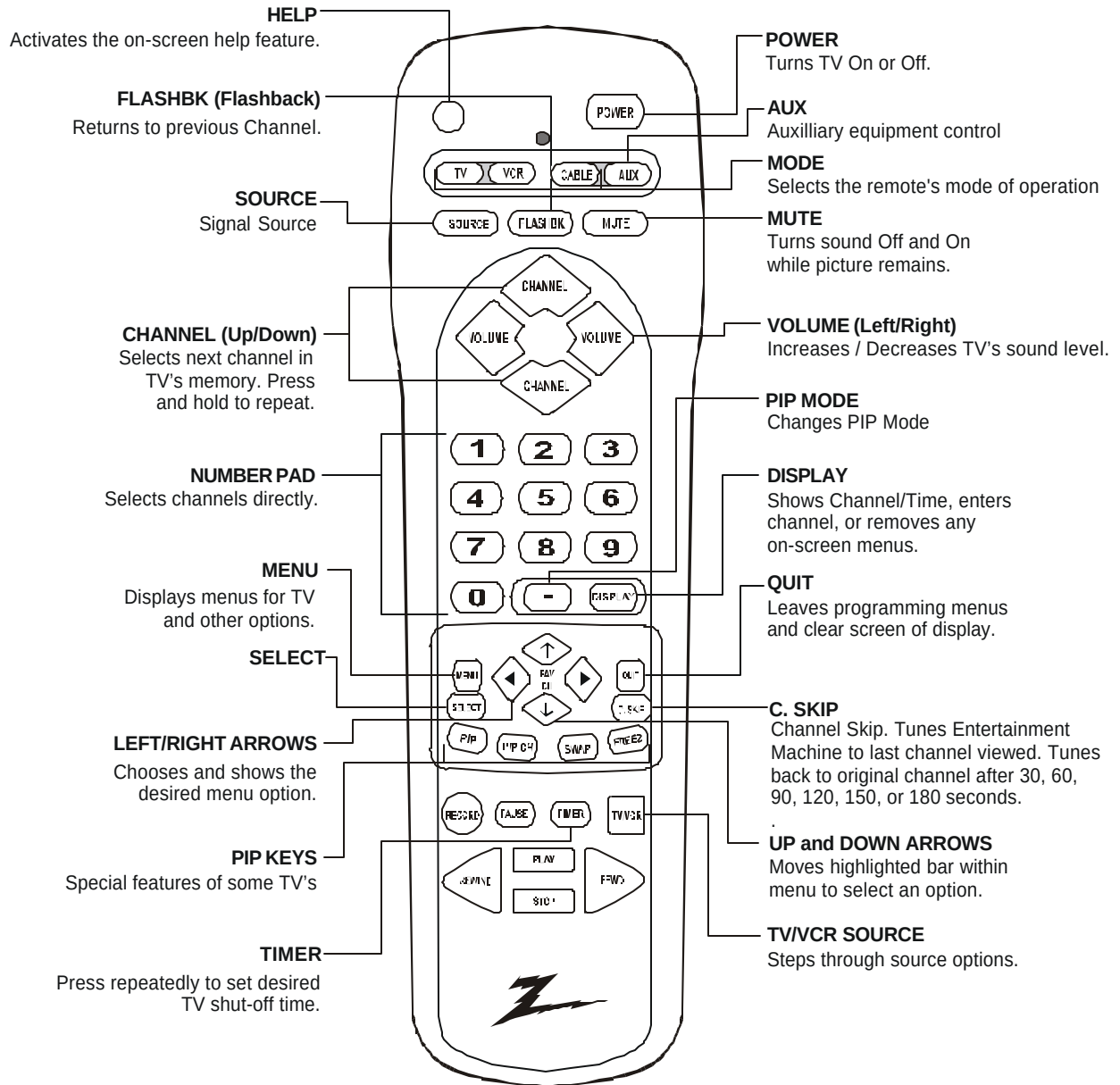


Figure 4. Rear Connection Panel

REMOTE CONTROL MODEL MBR3475Z



Remote Control Part Number.

MBR3475Z
924-10092

PROGRAMMING CODES

VCRS		VCRS (continued)		Cable Satellites (continued)	
Adventura	00	NEC	01, 05, 24, 26, 32	Century	12
Aiko	08	Nikko	23	Citizen	12
Aiwa	00	Noblex	45	Colour Voice	31, 45
Akai	01, 48, 49	Olympus	11, 22	Contronics	26, 29
American High	22	Optimus	19, 23, 32	Contec	22
Asha	45	Orion	51	Dae Ryung	21
Audiovox	23	Panasonic	10, 11, 22, 39, 53	Eastern	15
Beaumark	45	Penny	02, 05, 22, 23, 24, 45, 46	Electricord	32
Bell & Howell	32	Pentax	02, 03, 04	Everquest	56
Brandt	43	Philco	22	Focus	57
Broksonic	33, 34, 42, 42, 52	Philips	20, 29, 31	Garrard	12
Calix	23	Pilot	23	GC Electronics	33, 40
Canon	22	Pioneer	26	Gemini	04, 39, 44, 56
Capehart	06	Portland	06	Goldstar	11, 26
Carver	31	Protec	30	General Instruments	00, 13
CCE	08, 30	Pulsar	14	Hamlin	03, 09, 14, 23, 24
Citizen	08, 23	Quarter	17	Hitachi	00
Colt	30	Quartz	17	Hytex	37
Craig	18, 23, 30, 45	Quasar	22	Jasco	12
Curtis Mathis	01, 22, 47	Radio Shack	00, 23	Jerrold	00, 08, 13, 38, 53, 55, 56
Cybernex	45	Radix	23	Macom	36
Daewoo	06, 08, 16, 38, 50	Randex	23	Magnavox	16
Daytron	06	RCA	02, 03, 04, 35, 41, 47	Memorex	02
Dynatech	00	Realistic	00, 17, 18, 19, 20, 22, 23, 32, 45	Movie Time	30, 32, 34
Electrohome	23	Ricoh	21	NSC	30, 34, 39
Electrophonic	23	Runco	14	Oak	22, 37, 50
Emerx	07	Samsung	16, 45	Panasonic	02, 10, 49
Emerson	00, 08, 12, 15, 23, 27, 28, 33, 34, 37, 42, 48, 51, 52	Sanky	14, 19	Paragon	02
Fisher	18, 20, 32, 46	Sansui	01, 26	Philips	12, 16, 17, 27, 31, 43, 44, 45, 47
Fuji	09, 22	Sanyo	17, 18, 32, 45	Pioneer	06, 11, 20
Funai	00	Scott	15, 16, 33, 34, 37, 42	Popular Mechanics	57
Garrad	00	Sears	02, 04, 17, 18, 20, 22, 23, 32, 46	Pulsar	02
General Electric	03, 22, 41, 47	Sharp	19	RCA	49
Goldstar	23, 24, 44	Shintom	30	Realistic	40
Gradiente	00	Shogun	45	Recoton	57
Harley Davidson	00	Shinger	30	Regal	03, 09, 23, 35
Harman / Kardon	24	Sony	07, 09, 21, 22	Regency	15
Harwood	30	STS	02	Rembrandt	00, 39
Headquarter	17	Sylvania	00, 15, 22, 29, 31	Runco	02
Hi-Q	18	Symphonic	00	Samsung	11, 26
Hitachi	01, 02, 03, 04	Tatung	01	Scientific Atlanta	18, 21, 42, 48
Jensen	01	Teac	00, 01	Signal	26, 56
JVC	01, 13, 26	Technics	22, 39	Signature	00
KEC	08, 23	Teknika	00, 22, 23	SL Marx	26
Kenwood	01, 24, 26	Telefunken	43	Sprucer	01, 49
KLH	30	THK	27, 45	Starcom	38, 53, 56
Kodak	22, 23	Toshiba	15, 16, 20, 37	Stargate	26, 56
Lloyd	00	Totevision	23, 45	Starquest	56
Lloyd's	27	Unitech	45	Starsight	58, 59
Logik	30	Vector	16	Sylvania	19
LXI	23	Vector Research	05, 24	Teleview	26
Magnavox	14, 2, 29, 31, 35	Video Concepts	05, 16, 48	Texscan	19
Magin	45	Videosonic	45	Tocom	07, 28, 55
Marantz	22, 3	Wards	00, 02, 18, 19, 22, 30, 35, 37, 45, 47	Toshiba	02
Marta	23	XR 1000	00, 22, 30	Tusa	56
Matsushita	22	Yamaha	24	TV 86	30
MEI	22	Zenith	09, 14, 21, 55	Unika	12, 40
Memorex	00, 14, 17, 18, 19, 22, 23, 32, 45	Cable Satellites		United Artist	37
MGA	15, 48	ABC	00, 07, 08, 18, 19, 21, 37, 38, 53	United Cable	53
MGN Tech	45	Antronixs	40	Universal	12, 25, 32, 33, 35, 40
Minolta	02, 04	Archer	12, 25, 40	Videoway	51
Mitsubishi	15, 26, 40, 48, 49	Belcor	33	Viewstar	16, 29, 30, 41
Motorola	19, 22	Cable Star	33	Zenith	16, 29, 30, 41, 64
MTC	00, 45			Zentek	57
Multitech	00, 30			Hitachi (SAT)	61
				RCA (SAT)	62
				Sony (SAT)	63

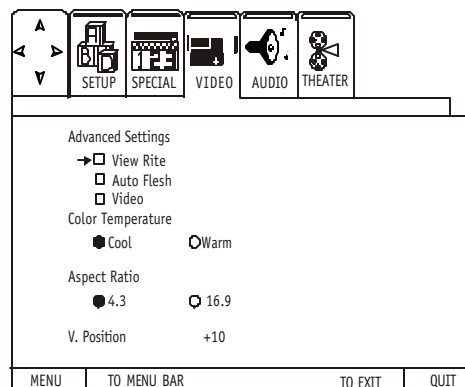
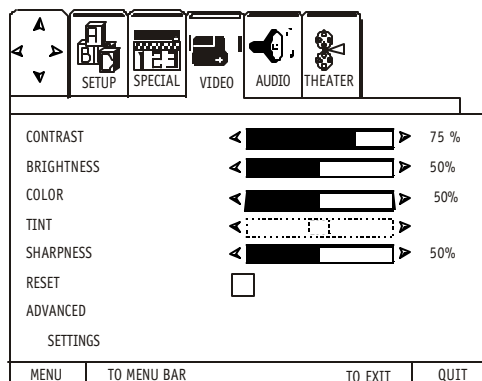
PROGRAMMING CODES

DVD Players	
Denon	03
Hitachi	06
JVC	00
Kenwood	03
Magnavox	04
Mitsubishi	09
Panasonic	03
Pioneer	02
Philips	05
RCA (ProScan)	08
Sony	01
Toshiba	04
Yamaha	07
Zenith	04, 10
CD Players	
Adcom	11
Aiwa	12
California Audio	13
Carver	12
Denon	14
DKK	15
Emerson	11
Fisher	16
Genexxa	17
Hitachi	11, 17, 18, 19, 20, 21, 22
JVC	23
Kenwood	16, 24, 25
Krell	12
Magnavox	12
Marantz	12, 13
MCS	13
Mission	13
NSM	12
Onkyo	26
Optimus	15, 17, 27
Panasonic	13
Philips	12
Pioneer	17, 27
Proton	12
QED	12
Quasar	13
RCA	11, 31
Realistic	11
Rotel	12
SAE	12
Sansui	12
Scott	11
Sony	15, 28
Technics	13, 29, 30
Victor	23
Tape Players	
Aiwa	42, 43
Hitachi	32, 33, 34, 35
Jerrold	44, 45
JVC	36
Kenwood	37
Optimus	38
Panasonic	39
Pioneer	38
Scientific Atlanta	46
Sony	40, 52, 42, 43
Starcom	44
Wards	38

Audio Amplifiers	
Aiwa	51, 52
Carver	47, 52, 53, 54
Casio	55
Clarinet	55
Denon	56
Fisher	54, 57
Hitachi	58
JVC	59
Kenwood	60, 61, 63, 64
Lloyd's	55
Magnavox	57, 63, 55
Marantz	47, 52, 62
MCS	62
Modulaire	55
Onkyo	55
Optimus	49, 50, 57, 61, 66
Panasonic	62
Penney	55
Philips	47, 52
Pioneer	49, 50, 66, 67, 68
Quasar	62
Realistic	55
Sansui	52
Sanyo	57
Sharp	61
Sony	51
Technics	48, 62, 69, 70, 71
Victor	59
Ward	49, 51, 52, 54, 66, 67
Yamaha	61, 72
York	55

CUSTOMIZED VIDEO AND AUDIO ADJUSTMENTS

Select VIDEO to adjust picture settings and improve picture quality.



Note: If contrast is selected, you are adjusting **CONTRAST**. The additional menu items, **BRIGHTNESS**, **COLOR**, **TINT**, and **SHARPNESS** can be adjusted in the same manner.

Contrast and Brightness adjustments will effect only the main picture. These adjustments will not affect the sub-picture.

Use Cursor **Up** or **Down** to highlight the function to be adjusted.
Press Cursor **Left** or **Right** to adjust function.
Press **QUIT** to exit menu.

CONTRAST

Use this function to change the contrast between black and white levels in the picture. This adjustment will only affect the picture when LIGHT SENTRY is OFF.

BRIGHTNESS

Use this function to adjust overall picture brightness.

COLOR

Use this function to adjust the color level in the picture.

TINT

Use this function to adjust flesh tones so they appear natural. (It may be necessary to adjust TINT to obtain optimum picture quality when using the COMPONENT:Y-CbCr Input 2 jacks).

SHARPNESS

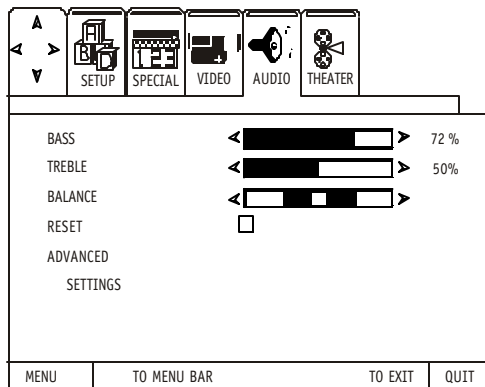
Use this function to adjust the amount of detail in the picture.

RESET

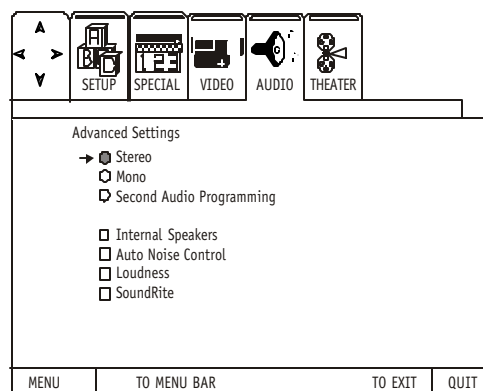
When RESET is selected, press CURSOR **RIGHT** to reset video settings to factory preset conditions.

CUSTOMIZED VIDEO AND AUDIO ADJUSTMENTS

Select AUDIO SETTINGS to adjust the AUDIO to your preference and improve the sound quality.



Note: If BASS is selected you are adjusting BASS. The additional menu items, TREBLE and BALANCE can be selected and adjusted in the same manner



Use Cursor **Up** or **Down** to highlight the function to be adjusted.
Press Cursor **Left** or **Right** to adjust function.
Press **QUIT** to exit menu.

BASS

This function controls the Low Frequency audio to all speakers.

TREBLE

This function controls the High Frequency audio to all speakers.

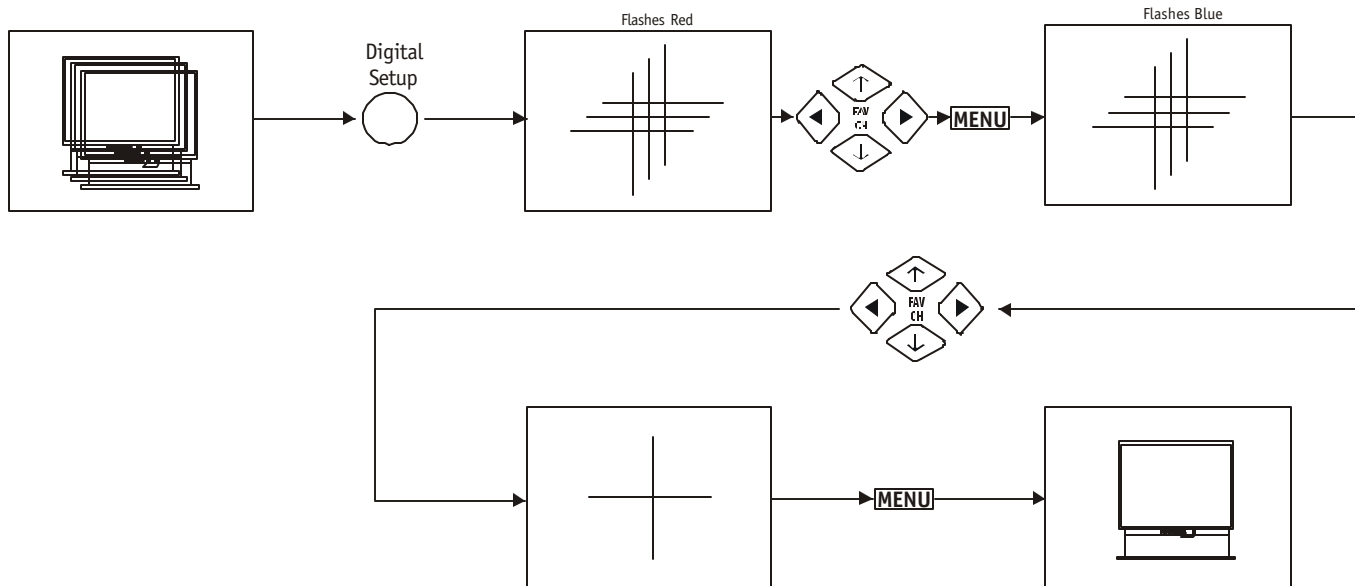
BALANCE

This function will control the left to right balance of the TV internal speakers and the VARIABLE AUDIO OUT output.

RESET

When RESET is selected, press CURSOR RIGHT to return audio adjustments to factory preset conditions.

ZP94/95 CUSTOMER CONVERGENCE ADJUSTMENT



CONVERGENCE ADJUSTMENT (DIGITAL SETUP)

To enter this adjustment mode, press the front panel DIGITAL SETUP button.

Press the ARROW buttons on the remote control to move the displayed color up, down, left, or right. (Press the QUIT button to toggle between red and blue)

Press MENU on the remote control to change the color you want to adjust.

Press the front panel DIGITAL SETUP button or the remote control MENU button when adjustment is done. This will save your adjustment into memory.

Note:

Only a momentary press of the DIGITAL SETUP button is necessary to enter DIGITAL SETUP convergence adjustment mode.

Do not press the DIGITAL SETUP button for more than three seconds.

To save your adjustment data into memory, press the front panel DIGITAL SETUP button or the remote control MENU button. If you do NOT wish to save your adjustment data into memory, turn the TV off. When the TV is ON again, your old convergence data will be restored.

To exit this function, press DIGITAL SETUP on the front panel of your Entertainment machine.

SERVICE MENUES

ITEM	SETTING	RANGE	DESCRIPTION
P01	ZP94/95	*Non-Adjustable Data	
ADJUST MODE	Version 704		
SUB BRT	☐	3C-C3	Sub Brightness
SERVICE	☐	0	SERVICE
DEF RESET	☐	0	
V/P RESET	☐	0	
3DYC RESET	☐	0	
FLEX RESET	☐	0	
DSP RESET	☐	0	
CCD RESET	☐	0	
FACT RESET	☐	0	Resets Memory
MEMORY INITIAL	☐	0	Resets Memory
P02	ZP94/95		
ADJUST MODE			
TA1300 31.5khz Mo	315		
H POSI	40	00-7F	Horizontal Position
FLEX CONT			
VD POS	3F	00-7F	Vertical Position
UPD64081			
DYGA	09	00-0F	Y Motion Detection Gain
DCGA	06	00-0F	Chroma Motion Detection Gain
VAPGA	00	00-07	Vertical Aperture Controle Gain
VAPIN	00	00-1F	Vertical Aperture Controle Invert
YHCOR	00	00-01	Y Output High Frequency Coring
P02	ZP94/95		
ADJUST MODE			
TA1300 33.75khz M	3375		
H POSI	40	00-7F	Horizontal Position
FLEX CONT			
VD POS	3F	00-7F	Vertical Position
UPD64081			
DYGA	09	00-0F	Y Motion Detection Gain
DCGA	06	00-0F	Chroma Motion Detection Gain
VAPGA	00	00-07	Vertical Aperture Controle Gain
VAPIN	00	00-1F	Vertical Aperture Controle Invert
YHCOR	00	00-01	Y Output High Frequency Coring
P03	ZP94/95		
ADJUST MODE			
TA1270-M			
TINT (TV)	3C	00-7F	Main NTSC Tint
TOFFO (TV)	00	00-07	Main NTSC TOF f0 Peak Frequency Switch
TOFQ (TV)	00	00-07	Main NTSC TOFQ Switch
SUB CNT	0F	00-1F	Main NTSC Contrast
SUB CL	1B	00-1F	Main NTSC Color
P03	ZP94/95		
ADJUST MODE			
TA1270-S			
TINT (TV)	3C	00-7F	Main NTSC Tint
TOFFO (TV)	00	00-07	Main NTSC TOF f0 Peak Frequency Switch
TOFQ (TV)	00	00-07	Main NTSC TOFQ Switch
SUB CNT	0F	00-1F	Main NTSC Contrast
SUB CLR	1B	00-1F	Main NTSC Color

SERVICE MENUES CONT.

ITEM	SETTING	RANGE	DESCRIPTION
P04	ZP94/95	*Non-Adjustable Data	
FLEX CONT	NTSC		
39 HHPF1	00	00-01	Characteristic Switch 0 = Low Frequency, 1 = High Frequency
41 V-CRG	00	00-03	Vertical Enhance Coring
42 H-CRG	00	00-03	Horizontal Enhance Coring
43 V-ENH	00	00-03	Vertical Enhance
44 H-ENH	00	00-03	Horizontal Enhance
96 YVHENH	0B	00-1F	Y Vertical & Horizontal Enhance Gain
100 CVHENH	12	00-1F	Color Vertical & Horizontal Enhance Gain
P04	ZP94/95		
FLEX CONT	ATSC	(480i, 480p, 1080i, 720p)	
39 HHPF1	00	00-01	Characteristic Switch 0 = Low Frequency, 1 = High Frequency
41 V-CRG	00	00-03	Vertical Enhance Coring
42 H-CRG	00	00-03	Horizontal Enhance Coring
43 V-ENH	00	00-03	Vertical Enhance
44 H-ENH	00	00-03	Horizontal Enhance
96 YVHENH (720p)	00 (10)	00-1F	Y Vertical & Horizontal Enhance Gain
100 CVHENH	12	00-1F	Color Vertical & Horizontal Enhance Gain
P05	ZP94/95		
FLEX CONT	NTSC		
71 YV-ENH	00	00-0F	Y Vertical Enhance Gain
79 CV-ENH	00	00-0F	Color Vertical Enhance Gain
87 YH-ENH	07	00-0F	Y Horizontal Enhance Gain
94 CH-ENH	0F	00-0F	Color Horizontal Enhance Gain
66 YV-DSB	00	00-03	Y Vertical Dynamic Shoot Balance Gain
75 CV-DSB	00	00-03	Color Vertical Dynamic Shoot Balance Gain
82 YH-DSB	00	00-03	Y Horizontal Dynamic Shoot Balance Gain
90 CH-DSB	00	00-03	Color Horizontal Dynamic Shoot Balance Gain
69 YV-CLP	00	00-0F	Y Vertical Enhance Clip Offset
84 YH-CLP	00	00-0F	Y Horizontal Enhance Clip Offset
P05	ZP94/95		
FLEX CONT	ATSC	(480i, 480p, 1080i, 720p)	
71 YV-ENH	00	00-0F	Y Vertical Enhance Gain
79 CV-ENH	00	00-0F	Color Vertical Enhance Gain
87 YH-ENH (1080i)	07 (00)	00-0F	Y Horizontal Enhance Gain
94 CH-ENH	0F	00-0F	Color Horizontal Enhance Gain
66 YV-DSB	00	00-03	Y Vertical Dynamic Shoot Balance Gain
75 CV-DSB	00	00-03	Color Vertical Dynamic Shoot Balance Gain
82 YH-DSB	00	00-03	Y Horizontal Dynamic Shoot Balance Gain
90 CH-DSB	00	00-03	Color Horizontal Dynamic Shoot Balance Gain
69 YV-CLP	00	00-0F	Y Vertical Enhance Clip Offset
84 YH-CLP	00	00-0F	Y Horizontal Enhance Clip Offset
P06	ZP94/95		
FLEX CONT	NTSC		
97 YV-NLP	00	00-3F	Y Vertical Nonlinear Peaking
98 YH-NLP	0A	00-3F	Y Horizontal Nonlinear Peaking
101 Y-LMT	FF	00-FF	Y Amplitude Limit
83 YH-FRQ	00	00-03	Y Horizontal HPF Peak Frequency Switch
91 CH-FRQ	02	00-03	Color Horizontal HPF Peak Frequency Switch
70 YV-LTI	00	00-01	Y Vertical Enhance Clip 0 = Enhance, 1 = LTI
78 CV-CTI	00	00-01	Color Vertical Enhance Clip 0 = CTI, 1 = Enhance
86 YH-LTI	01	00-01	Y Horizontal Enhance Clip 0 = Enhance, 1 = LTI
93 CH-CTI	01	00-01	Color Horizontal Enhance Clip 0 = CTI, 1 = Enhance

SERVICE MENUES CONT.

ITEM	SETTING	RANGE	DESCRIPTION
P06	ZP94/95		*Non-Adjustable Data
FLEX CONT	ATSC		(480i, 480p, 1080i, 720p)
97 YV-NLP	00	00-3F	Y Vertical Nonlinear Peaking
98 YH-NLP	0A	00-3F	Y Horizontal Nonlinear Peaking
101 Y-LMT	FF	00-FF	Y Amplitude Limit
83 YH-FRQ	00	00-03	Y Horizontal HPF Peak Frequency Switch
91 CH-FRQ	02	00-03	Color Horizontal HPF Peak Frequency Switch
70 YV-LTI	00	00-01	Y Vertical Enhance Clip 0 = Enhance, 1 = LTI
78 CV-CTI	00	00-01	Color Vertical Enhance Clip 0 = CTI, 1 = Enhance
86 YH-LTI	01	00-01	Y Horizontal Enhance Clip 0 = Enhance, 1 = LTI
93 CH-CTI	01	00-01	Color Horizontal Enhance Clip 0 = CTI, 1 = Enhance
P07	ZP94/95		
FLEX CONT	NTSC		
69 YVDSBC	00	00-07	Y Vertical Dynamic Shoot Balance Coring Amplitude
77 CVDSBC	00	00-07	Color Vertical Dynamic Shoot Balance Coring Amplitude
85 YHDSBC	00	00-07	Y Horizontal Dynamic Shoot Balance Coring Amplitude
92 CHDSBC	00	00-07	Color Horizontal Dynamic Shoot Balance Coring Amplitude
95 Y-CRG	00	00-07	Y Coring Amplitude
99 C-CRG	00	00-07	Color Coring Amplitude
64 YNR-IN	04	00-07	YNR Input Level Gain
73 CNR-IN	04	00-07	CNR Input Level Gain
80 YNRPAS	00	00-07	YNR Passage Level Limit
88 CNRPAS	02	00-07	CNR Passage Level Limit
P07	ZP94/95		
FLEX CONT	ATSC		(480i, 480p, 1080i, 720p)
69 YVDSBC	00	00-07	Y Vertical Dynamic Shoot Balance Coring Amplitude
77 CVDSBC	00	00-07	Color Vertical Dynamic Shoot Balance Coring Amplitude
85 YHDSBC	00	00-07	Y Horizontal Dynamic Shoot Balance Coring Amplitude
92 CHDSBC	00	00-07	Color Horizontal Dynamic Shoot Balance Coring Amplitude
95 Y-CRG	00	00-07	Y Coring Amplitude
99 C-CRG	00	00-07	Color Coring Amplitude
64 YNR-IN	04	00-07	YNR Input Level Gain
73 CNR-IN	04	00-07	CNR Input Level Gain
80 YNRPAS	00	00-07	YNR Passage Level Limit
88 CNRPAS	02	00-07	CNR Passage Level Limit
P08	ZP94/95		
FLEX CONT	NTSC/ATSC		(480i, 480p, 1080i, 720p)
65 YNRRDC	00	00-07	YNR Reducing Gain
74 CNRRDC	00	00-07	CNR Reducing Gain
67 YNR-DC	00	00-03	YNR DC Shift
76 CNR-DC	00	00-03	Color DC Shift
81 YNR-0	00	00-07	YNR 0 Point
89 CNR-0	00	00-0F	CNR 0 Point
45 CB-BLK	07	00-0F	CB Blanking Level Offset
46 CR-BLK	07	00-0F	CR Blanking Level Offset
27 FRMBRT*	60	00-7F	Y Frame Bright
102 CLPOUT	7F	00-FF	Clamp Output Offset
P09	ZP94/95		
FLEX CONT	NTSC/ATSC		
10 MPLL-S	0F	00-1F	Main PLL Vertical Mask Pulse Start Position Offset
17 SPLL-S	0F	00-1F	Sub PLL Vertical Mask Pulse Start Position Offset
12 MPLL-E	0F	00-1F	Main PLL Vertical Mask Pulse End Position Offset
19 SPLL-E	0F	00-1F	Sub PLL Vertical Mask Pulse End Position Offset
11 MVW-PH	05	00-07	Main Vertical Write Input Horizontal Phase Adjustment
18 SVW-PH	05	00-07	Sub Vertical Write Input Horizontal Phase Adjustment
14 MHS-HP	0F	00-1F	Main Horizontal Sync Horizontal Phase Offset
21 SHS-HP	0F	00-1F	Sub Horizontal Sync Horizontal Phase Offset
13 MY-CLP	03	00-07	Main Y Clamp Reference Offset
20 SY-CLP	03	00-07	Sub Y Clamp Reference Offset

SERVICE MENUES CONT.

ITEM	SETTING	RANGE	DESCRIPTION
P10	ZP94/95	*Non-Adjustable Data	
FLEX CONT	NTSC/ATSC	(480i, 480p, 1080i, 720p)	
23 V-POS	3F	00-3F	Wide Vertical Position
24 V-SIZ	7F	00-FF	Wide Vertical Size
50 HD-POS	3F	00-7F	HD Position Offset
48 VBLK-T	7F	00-FF	Vertical Blanking Top Position Offset
49 VBLK-B	7F	00-FF	Vertical Blanking Bottom Position Offset
51 HBLK-R	7F	00-FF	Horizontal Blanking Right Position Offset
52 HBLK-L	7F	00-FF	Horizontal Blanking Left Position Offset
40 READ F	10	00-3F	A/D Converter Clock Sampling Phase
P11	ZP94/95		
FLEX CONT	NTSC/ATSC	(480i, 480p, 1080i, 720p)	
35 FRMTOP-2	07	00-0F	Frame Top Position Offset (2Pix)
FRMTOP-L*	07	00-0F	Frame Top Position Offset (Letter)
36 FRMBTM-2	07	00-0F	Frame Bottom Position Offset (2Pix)
FRMBTM-L*	07	00-0F	Frame Bottom Position Offset (Letter)
37 FRMRGT	07	00-0F	Frame Right Position Offset
38 FRMLFT	07	00-0F	Frame Left Position Offset
59 BS-TOP	07	00-0F	Black Strech Stop Pulse Top Position Offset
60 BS-BTM	07	00-0F	Black Strech Stop Pulse Bottom Position Offset
61 BS-RGT	07	00-0F	Black Strech Stop Pulse Right Position Offset
62 BS-LFT	07	00-0F	Black Strech Stop Pulse Left Position Offset
P12	ZP94/95		
FLEX CONT			
120 TV/CINE	01	00-01	TV Cinema Detection
121 T/C DET	07	00-0F	TV Cinema Detection Vertical Gate Area Start Position
122 T/C UNL	01	00-07	TV Cinema Detection Unlock Protection Count
123 T/C LCK	03	00-0F	TV Cinema Detection Lock Protection Count
126 T/C ARE	05	00-FF	TV Cinema Detection Motion Area Border Volume Offset
127 T/C CBR	07	00-0F	TV Cinema Detection Color 2 Bit Border Volume Offset
128 T/C YBR	07	00-0F	TV Cinema Detection Y 2 Bit Border Volume
P13	ZP94/95		
TA1298	NTSC		
SHARP	0C	00-1F	Sharpness (Center Adjustment)
APACON	06	00-07	APACON Peak f0
YNR	00	00-03	YNR
P13	ZP94/95		
TA1298	480I		
SHARP	0A	00-1F	Sharpness (Center Adjustment)
APACON	06	00-07	APACON Peak f0
YNR	00	00-03	YNR
P13	ZP94/95		
TA1298	480P		
SHARP	0A	00-1F	Sharpness (Center Adjustment)
APACON	06	00-07	APACON Peak f0
YNR	00	00-03	YNR
P13	ZP94/95		
TA1298	1080I		
SHARP	07	00-1F	Sharpness (Center Adjustment)
APACON	05	00-07	APACON Peak f0
YNR	00	00-03	YNR
P13	ZP94/95		
TA1298	720P		
SHARP	0A	00-1F	Sharpness (Center Adjustment)
APACON	06	00-07	APACON Peak f0
YNR	00	00-03	YNR

SERVICE MENUES CONT.

ITEM	SETTING	RANGE	DESCRIPTION
P14	ZP94/95		*Non-Adjustable Data
TA1298	NTSC		
COLOR	40	00-7F	Color (Center Adjustment)
TINT	45	00-7F	Tint (Center Adjustment)
R-Y PH	02	00-03	R-Y Phase
R/B GA	01	00-03	R/B Gain
G-Y PH	00	00-03	G-Y Phase
G/B GA	00	00-03	G/B Gain
COLOR SYSTEM	00	00-07	COLOR SYSTEM
P14	ZP94/95		
TA1298	SDTV		
COLOR	4F	00-7F	Color (Center Adjustment)
TINT	3B	00-7F	Tint (Center Adjustment)
R-Y PH	02	00-03	R-Y Phase
R/B GA	02	00-03	R/B Gain
G-Y PH	01	00-03	G-Y Phase
G/B GA	00	00-03	G/B Gain
COLOR SYSTEM	01	00-07	COLOR SYSTEM
P14	ZP94/95		
TA1298	HDTV		
COLOR	40	00-7F	Color (Center Adjustment)
TINT	43	00-7F	Tint (Center Adjustment)
R-Y PH	00	00-03	R-Y Phase
R/B GA	02	00-03	R/B Gain
G-Y PH	02	00-03	G-Y Phase
G/B GA	00	00-03	G/B Gain
COLOR SYSTEM	01	00-07	COLOR SYSTEM
P15	ZP94/95		
TA1298			
RGB BRT	50	00-7F	RGB Brightness
RGB CNT	50	00-7F	RGB Contrast
G DRV (W)	39	00-7F	Green Drive (WARM)
B DRV (W)	2D	00-7F	Blue Drive (WARM)
SUB CLR	10	00-1F	Sub Color (Demodulator)
SUB CNT	1F	00-1F	Main NTSC Contrast
VSM PH	05	00-07	VM Phase
VSM GA	00	00-03	VM Gain
OS ACL	01	00-01	OSD Auto Contrast Limiter Switch
RGB ACL	00	00-01	RGB Auto Contrast Limiter Switch
P16	ZP94/95		
TA1298			
CLR G	00	00-03	Color G Corection Piont
CLT	00	00-01	Color Limiter Level
YOUT G	00	00-01	Y G (After Contrast) Switch
YG PNT	00	00-01	Y G Point
S TRK	00	00-03	Sharpness Tracking
RGBG	00	00-01	RGB Switch
DC PNT	00	00-07	DC Restoration Point
DC RAT	00	00-07	DC Restoration Rate
DC LMT	00	00-03	DC Restoration Limit Point

SERVICE MENUES CONT.

ITEM	SETTING	RANGE	DESCRIPTION
P17	ZP94/95	*Non-Adjustable Data	
TA1298			
BSP	03	00-07	Black Strech Point
APL/BS	00	00-03	APL / Black Strech Point
B COR	01	00-01	Black Level Correction
B GA	00	00-01	Black Strech Gain
B DET	00	00-01	Black Detect Level
DABL PN	00	00-07	Dynamic ABL Detection Point
DABL GA	07	00-07	Dynamic ABL Gain
ABL PN	07	00-07	ABL Detection Point
ABL GA	05	00-07	ABL Gain
P18	ZP94/95		
V CHIP RATING			
POLLING	0F	00-0F	0
TIMEOUT	05	00-0F	0
STATUS	02	00-0F	0
AFC/CLOCK TEST	☐		

SERVICE ADJUSTMENTS ORDER

SERVICE ADJUSTMENT PROCEDURE ORDER

The following is the suggested order for adjustment procedures.

ZP 94/95 SERVICE ADJUSTMENT ORDER "PREHEAT BEFORE BEGINNING"				
Order	Adjustment Item	Screen Format	Signal	DCU Data
	Pre HEAT	N/A	NTSC	N/A
1	Cut Off	Progressive	NTSC	
2	Pre Focus Lens and Static	Progressive	NTSC	
3	DCU Phase Data Setting	Progressive	NTSC	
4	DCU Phase Data Setting	HD	2.14H	
5	Horz. Position Adj. (Coarse)	Progressive	NTSC	
6	Horz. Position Adj. (Coarse)	HD	2.14H	
7	Raster Tilt	Progressive	NTSC	CLEAR
8	Beam Alignment	Progressive	NTSC	
9	Raster Position	Progressive	NTSC	CLEAR
10	Horz. Size Adjust	Progressive	NTSC	CLEAR
	Horz. Size Adjust	HD	2.14	CLEAR
11	Vertical Size Adjust	Progressive	NTSC	CLEAR
12	Beam Form	Progressive	NTSC	
13	Lens Focus Adjust	Progressive	NTSC	
14	Static Focus Adjust	Progressive	NTSC	
15	Blue Defocus	Progressive	NTSC	
16	White Balance Adjustment	Progressive	NTSC	
17	Sub Brightness Adjustment	Progressive	NTSC Color Bar	
18	Horz. Position Adjustment	Progressive	NTSC	
19	Horz. Position Adjustment	HD	2.14H	
20	Convergence Alignment	Progressive	NTSC	CLEAR to start
21	Convergence Alignment	HD	2.14H	
It is necessary to follow the order when performing an alignment on the ZP 94/95 chassis.				

CONVERGENCE ADJUSTMENT

MEMORY INITIALIZATION PROCEDURE

WARNING: This should only be done in extreme cases. I2C Data will be reset as well. Be sure and write down all data values before continuing.

1. Disconnect Power to Television.
2. Remove the Back Cover.
3. Remove the two screws holding the Main chassis to the Cabinet if necessary.
4. Disconnect wiring harness clips to free up the chassis if necessary.
5. Reconnect Power to the Television and turn the set ON.
6. Locate PP1 and add a jumper between pins 1 and 2 of the PP1 connector.
7. Hold jumper in place for 5 seconds. (A beep will NOT be heard).
8. Remove the jumper.
9. Confirm EEPROM reset, Input source is now set to Air and not to Cable 1 or 2. No Child Lock, and only channels 2 through 13 are in memory.
10. Reassemble Chassis and reinstall PTV back. Set is now ready to operate.

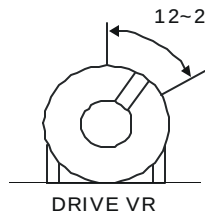
NOTE: All customers' Auto Programming and Set-Ups are returned to factory settings.

Pre HEAT

PRESET EACH ADJUSTMENT VR TO CONDITION AS SHOWN:

A) Before Pre Heat Run.

1. Red and Green Drive VR on the CRT PWB. (Not on Blue CRT).



Pre set between the 12 o'clock and 2 o'clock position.

2. SCREEN VR ON FOCUS PACK.



Pre Set fully counter clockwise.

3. Focus VR on focus pack



Pre Set fully clockwise.

CUT OFF

ADJUSTMENT PREPARATION:

A) Pre Heat Run should be finished.

ADJUSTMENT PROCEDURE:

1. Go to I²C ADJ Mode. Press and hold the "Source" key on the front panel and then POWER ON to access I²C adjustment mode.
2. Choose SERVICE item [2] of I2C ADJ. Mode. (Select CURSOR RIGHT (right arrow key).
3. Screen VR should be turned clockwise gradually and set so that retrace lines begin to appear.
4. Return to "normal" mode by using the "left arrow" key.
5. Adjust focus VR's so that focus is even all around the screen.

PRE-FOCUS ADJUSTMENT

Adjustment preparation

1. The set can face in any direction: west, east, north or south.
2. Receive the cross-hatch pattern signal.

CONTRAST : 60-70%

BRIGHTNESS : 50%

3. The electrical focus adjustment should have been completed.
4. The centering DY inclination should have been adjusted.

Adjustment procedure

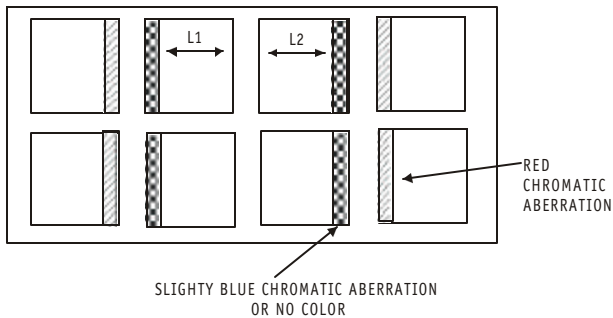
1. Loosen the fixing screw on the lens cylinder so that the lens cylinder can be turned. (Be careful not to loosen too much. If the screw is loosened too much, rattling when tightening becomes greater and the focus may drift). After completing steps (5), (6), and (7) below, tighten the fixing screws for each lens with a torque of 12~17 Kgf cm.
2. Apply covers to 2 of R, G, and B lenses, and project a single color on the screen and adjust in sequence. (The adjustment order of R, G, and B is only an example.)
3. For each of the R, G, and B lenses, observe the color aberration generated on the outer circumference of the cross-hatch bright line at the center section (3 pitches vertically and horizontally from the center.)
4. If the lens adjustment knob is turned clockwise, viewed from the front, the color aberration changes as follows.

CONVERGENCE ADJUSTMENT

Lens	Change of color aberration
R Lens	Red → Crimson
G Lens	Blue → Red
B Lens	Purple → Green

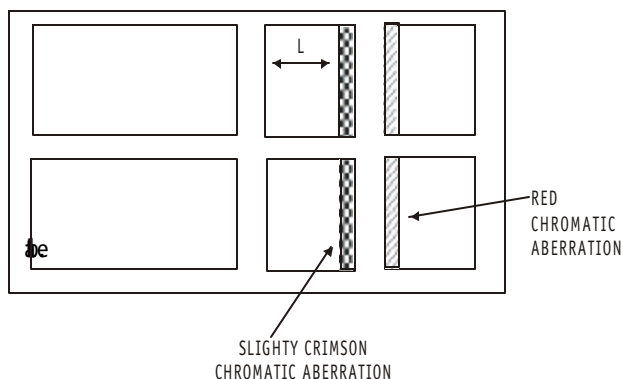
Set Size	Pitch between L
50"	3.0 cross-hatch pitches
60"	3.0 cross-hatch pitches

5. In case of G lens, set to the point where the chromatic aberration switches from blue to red. If the chromatic aberration appearing all over the screen is not the same, observe the vertical bright line at the center of the screen and set to the position where red chromatic aberration slightly appears inside and blue outside (reference value: 1~3mm) within the cross-hatch pitches specified in next table. When the red chromatic aberration appearing at both sides of the bright line is not equal, observe the side with larger chromatic aberration when adjusting.

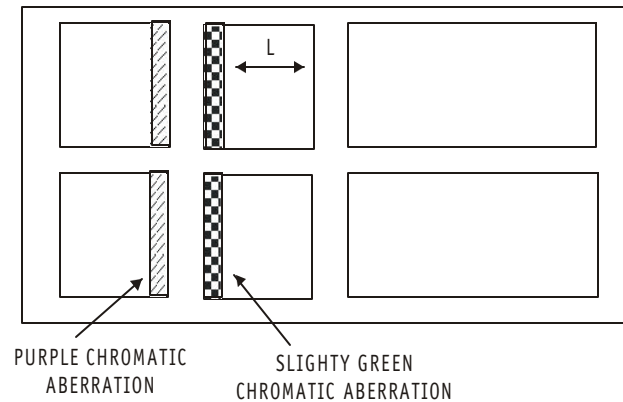


Set Size	Pitch between L1 & L2
50"	3.0 cross-hatch pitches
60"	3.0 cross-hatch pitches

6. In case of R lens, set to the position where the chromatic aberration changes from red to crimson. As shown below, observe the vertical bright line at the center and set to the position where the crimson chromatic aberration slightly appears inside and red outside (reference value: 1~3mm) within the cross-hatch pitches specified in next



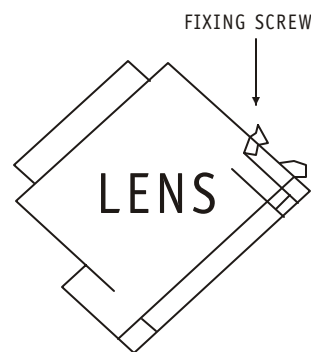
7. In case of B lens, set to the position where the chromatic aberration changes from purple to green. As shown below, observe the vertical bright line at the center and set to the position where green chromatic aberration slightly appears inside and purple outside (reference value: 1~3mm) within the cross-hatch pitches specified in next table.



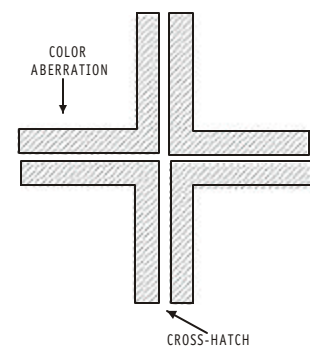
Set Size	Pitch between L
50"	3.0 cross-hatch pitches
60"	3.0 cross-hatch pitches

NOTES:

1. Fixing screw



2. Color aberration



3. Since the G light is very important for picture quality and performance, pay special attention in its adjustment.

NOTE: Be careful not to touch the lens with your fingers when adjusting.

CONVERGENCE ADJUSTMENT

4. For red, setting to the center between red and crimson is optimum.
5. For blue, setting to the center between purple and green is optimum.

DCU PHASE DATA SETTINGS

Adjustment Preparation

1. Cut off adjustment should be finished
2. VIDEO CONTROL: Factory Preset Condition

Adjustment procedure

PROGRESSIVE MODE

1. Receive any NTSC signal (Set is in Progressive mode)
2. Push "SERVICE ONLY" SW on Deflection PWB (Enter to DCU ADJ. Mode)
3. Push (?) key on R/C. (Green cross hatch is displayed). Then push (QUIT) key on R/C. (Character pattern is displayed. This is the PHASE setting mode)
4. Set PH-H phase data as shown below using (4) and (6) key.
5. Set PH-V phase data as shown below using (2) and (5) key.
6. Set CR-H phase data as shown below using (<) and (>) key.
7. Set CR-V phase data as shown below using (up) and (down) arrow keys.
8. Push (?) key on R/C to exit from the PHASE mode.
9. Push (-)* key on R/C 2 time to write the phase data to the E2PROM.
10. When Green dots are displayed, push (MUTE) key to return to DCU ADJ. mode.
11. Push "SERVICE ONLY" SW to return to RF or VIDEO mode.

HD MODE

12. Receive any HD signla (Set is in HD Mode)
13. Repeat (2)~(11) procedure again.

PROGRESSIVE MODE

PHASE MODE:

PH-H: BB
PH-V: OC
CR-H: 4C
CR-V: 00

HD MODE

PHASE MODE:

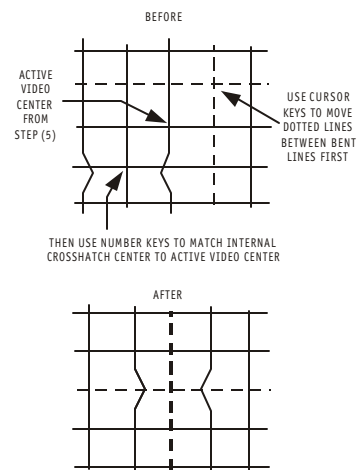
PH-H: BB
PH-V: 07
CR-H: 4C
CR-V: OC

PROGRESSIVE MODE

- 1) Receive any NTSC crosshair signal.
- 2) Screen Format is **PROGRESSIVE**.
- 3) Press the **SERVICE ONLY** switch on the deflection PWB and display the Digital Convergence Crosshatch pattern.
- 4) Mark the center of the Digital Convergence Crosshatch Pattern with finger and press the **SERVICE ONLY** switch to return to normal mode.
- 5) Enter the **I²C** Bus alignment menu and select Item [12] **H POSI** and adjust the data so that the center of Video matches the location of the Digital Crosshatch pattern noted in step {4}.
- 6) Exit from the **I²C** Menu.

HD Mode Adjustment

- 1) Receive any 2.14H signal.
- 2) Screen Format is **HD**.
- 3) Press the **SERVICE ONLY** switch on the deflection PWB and display the Digital Convergence Crosshatch pattern.
- 4) Mark the center of the Digital Convergence Crosshatch Pattern with finger and press the **SERVICE ONLY** switch to return to normal mode.
- 5) Enter the **I²C** Bus alignment menu and select Item [12] **H POSI** and adjust the data so that the center of Video matches the location of the Digital Crosshatch pattern noted in step {4}.
- 6) Exit from the **I²C** Menu.



CHASSIS HORIZ PHASE (COARSE) ADJUSTMENT

Adjustment Preparation:

- 1) Cut Off, DCU Phase adjustments should be finished.
- 2) Video Control: Brightness 90%, Contrast Max.

Adjustment Procedure

RASTER INCLINATION ADJUSTMENT (DEFLECTION YOKE)

Adjustment preparation

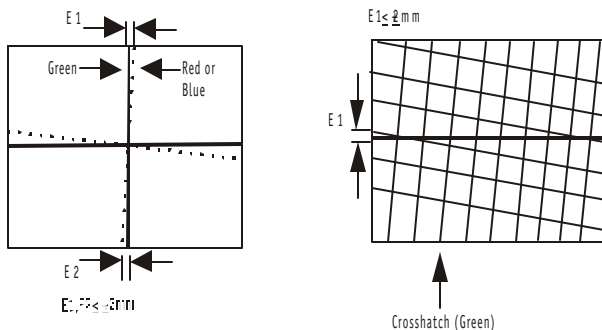
1. The set can face any direction.
2. Input the single cross test signal.

CONVERGENCE ADJUSTMENT

3. Set video conditions to factory reset.
4. The lens focus adjustment should have been completed, screen format should be progressive.
5. The electric focus should have been coarse adjusted.
6. The digital convergence RAM should be cleared (uncorrected state). With the TV set off, press and hold the service switch located on the Power/Deflection PWB and then press the power button.
7. Start adjustment 20 minutes or more after TV is turned on.

Adjustment procedure

1. Apply covers to the R and B lenses and project only green light or short 2P plug on R & B.
2. Turn the G deflection yoke and adjust the vertical raster inclination.
3. Then, remove the cover of R or B lens and project red or blue light together on the screen.
4. Turn the deflection yoke of R or B and set so that the inclination of R or B with respect to the green light is as shown below on the top and bottom sides.
5. After raster inclination adjustment, fixing screw of DY should be screwed with 12+2kg-cm torque.



Notes:

1. If internal cross-hatch does not appear after clearing RAM data, press service switch again, on POWER/DEFLECTION PWB.
2. To restore old RAM data, turn TV off and on.

BEAM ALIGNMENT

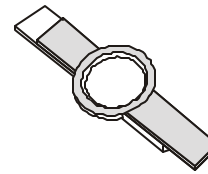
Adjustment preparation

1. Adjust at least 30 minutes after turning on power switch.
2. Raster inclination, centering, horizontal and vertical amplitudes, and optical focus adjustment should be completed.

3. Set video conditions, Brightness to 90% and Contrast MAX.
4. Receive cross-hatch signals. (Use of internal cross-hatch signals allowed.) Raster Tilt should be finished.
5. Screen format should be Progressive.

Adjustment procedure

1. Green (G) tube beam alignment adjustment. Short-circuit 2P subminiature connector plug pins of Red (R) and Blue (B) on the CPT boards and project only Green (G) tube.
2. Put Green (G) tube beam alignment magnet to the cancel state as shown below.
3. Turn the Green (G) static focus (Focus Pack) counter-clockwise all the way and make sure of position of cross-hatch center on screen. (Halo state.)
4. Turn the Green (G) static focus (Focus Pack) clockwise all the way. (Blooming state.)
5. Turn two magnets forming alignment magnet in any desired direction and move cross-hatch center to position found in (3).
6. If image position does not shift when Green (G) static focus (Focus Pack) is turned. Green (G) beam alignment has been completed.
7. If image position shifts when Green (G) static focus (Focus Pack) is turned, repeat (2)-(6).
8. Conduct beam alignment for Red (R) focus: Focus Pack UFPK, Blue (B) focus: Focus Pack UFPK.
9. Upon completion of adjustment, fix beam alignment magnets with white paint.



VERT & HORIZ PICTURE POSITION ADJUSTMENT

Adjustment preparation

1. Select signal on main picture.
2. Video settings have to be at normal condition.

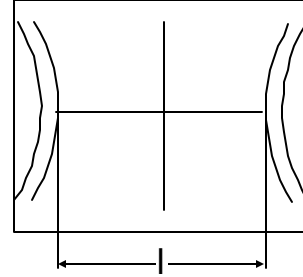
Adjustment procedure

1. Press the SOURCE and POWER button on Control Panel at same time to access VIDEO CHROMA ADJUST mode.
2. Select H POSI and V POSI using ▲ ▼ buttons.
3. Adjust the H POSI (HORIZONTAL) and V POSI (VERTICAL) position using ◀ ▶ buttons.

CONVERGENCE ADJUSTMENT

- Press MENU button to exit VIDEO CHROMA ADJUST mode.
- Select single PINP mode and move the sub picture, using the MOVE button. Distance between PINP and edge of screen should be equal when moved. If it is not, repeat (1) ~ (5).

NOTE: For ZP94/95 Models check the position of MULTI PINP mode. Check the right edge of the sub pictures for MV-4 to make sure there is no separation between the MULTI PINP and the edge of the screen.



HORIZONTAL SIZE

- Digital Convergence RAM should be cleared. With Power Off, press and hold the **Service Only Switch** on the Deflection PWB, then press **Power**.

Adjustment Preparation

- The set can face east or west
- Set video conditions to factory preset.
- The electric focus should have been coarse adjusted.
- Start adjustment 20 minutes or more after TV is turned on.

Adjustment Procedure

PROGRESSIVE MODE

- Receive any NTSC signal.
- Press the SERVICE ONLY SW on DEFLECTION PWB.
- Locate the horizontal size VR (R683). Adjustable the horizontal size to the table below.

HD MODE

- Input 1080i (fH=33.75kHz) component signal to VIDEO 1 or 2.
- Press the SERVICE ONLY SW on DEFLECTION PWB.
- Locate the horizontal size VR (R686). Adjustable the horizontal size to the following table.

Size	Progressive Mode	HD Mode
50"	1050mm	1050mm
60"	1200mm	1200mm

Adjust Horizontal Size until the size matches the chart below.

VERTICAL SIZE

- Digital Convergence RAM should be cleared. With Power Off, press and hold the **Service Only Switch** on the Deflection PWB, then press **Power**.

Adjustment Preparation

- The set can face east or west
- Set video conditions to factory preset.
- The electric focus should have been coarse adjusted.
- Start adjustment 20 minutes or more after TV is turned on.

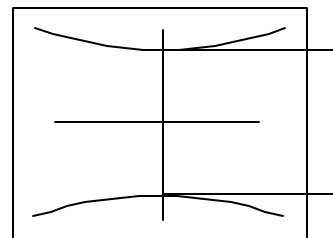
Adjustment Procedure

PROGRESSIVE MODE

- Receive any NTSC signal.
- Press the SERVICE ONLY SW on DEFLECTION PWB.
- Locate the vertical size VR (R630). Adjustable the vertical size according to the table below.

Size	l
50"	670mm
60"	775mm

Adjust Vertical Size until the size matches the chart below.



BEAM FORM

Adjustment preparation

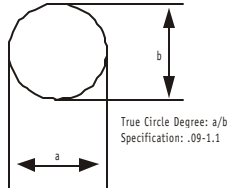
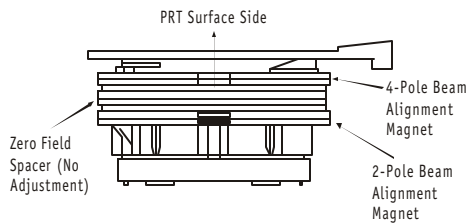
- The beam alignment should have been completed.
- The raster inclination, centering, horizontal/vertical amplitude and optical focus adjustments should have been completed.

CONVERGENCE ADJUSTMENT

3. Set video conditions to Brightness to 90 % and Contrast to MAX.
4. Input the dot signal.

Adjustment procedure

1. Green CRT beam shape adjustment. Short-circuit 2P sub-mini connectors on Red and Blue CRT P.W.B.'s to project only the Green beam.
2. Turn the green static focus fully clockwise. (Blooming.)
3. Make the dot at the screen center a true circle using the 4-pole magnet as shown below.
4. Also adjust the Red and Blue CRT beam shapes according to the steps (1) to (3).
5. After the adjustment has been completed, return R,G and B static VRs to the just focus point.



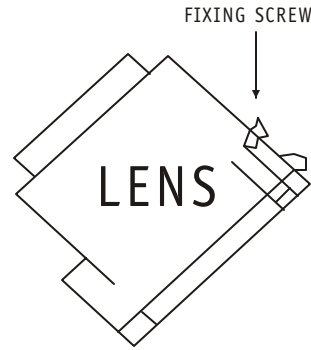
LENS FOCUS ADJUSTMENT

Preparation for adjustment

1. Receive the Cross-hatch pattern signal.
2. The electrical focus adjustment should have been completed.
3. Deflection Yoke tilt should have been adjusted.
4. Brightness = 50%
5. Contrast = 60% to 70%

Adjustment procedure

6. Short the 2 pin sub-miniature connector on the CRT P.W.B. TS, to produce only the color being adjusted and adjust one at a time. (The adjustment order of R, G and B is just an example.)
7. (See Figure below) Loosen the fixing screw on the lens assembly so that the lens cylinder can be turned. (Be careful not to loosen the screw too much, as this may cause movement of the lens cylinder when tightening.)



8. Rotate the cylinder back and forth to obtain the best focus point, while observing the Cross-Hatch. (Observe the center of the screen).

Hint: Located just below the screen are the two wooden panels. Remove the panels to allow access to the focus rings on the Lenses.

9. After completing optical focus, tighten the fixing screws for each lens.
10. When adjusting the Green Optical focus, be very careful. Green is the most dominant of the color guns and any error will be easily seen.
11. Repeat Electrical Focus if necessary.

STATIC FOCUS ADJUSTMENT

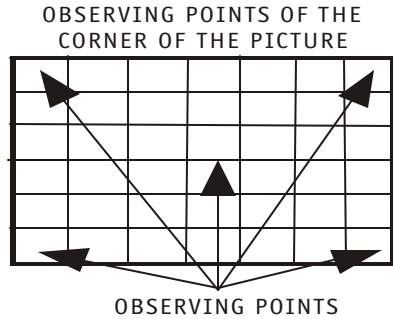
Adjustment preparation

1. The lens focus should be finished.
2. Set video conditions to Contrast to MAX and brightness to 50%.
3. Receive the cross-hatch pattern signal.
4. Apply covers to the lenses of colors other than the color to be adjusted and project a single color.

Adjustment procedure

1. Red (R), Green (G) and Blue (B) static focus adjustment. Vary the static focus VR(focus pack UFPK) and make the center of the cross-hatch pattern clearest.
2. Observe the corners of the picture and check that the focus does not get conspicuously worse.

CONVERGENCE ADJUSTMENT



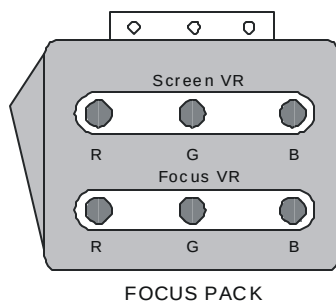
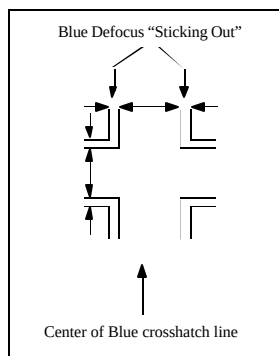
BLUE DEFOCUS ADJUSTMENT

Adjustment preparation

1. Optical and electrical focus adjustment should have been completed.
2. The convergence adjustment should have been completed.
3. Set Video conditions to factory reset.

Adjustment procedure

1. Input a Crosshatch Signal to VIDEO input.
2. Short-circuit 2P sub-mini connectors on the red and green CPT P.W.B.s to display only the blue beam.
3. Turn the B Focus VR(Focus Pack) fully clockwise.
4. Adjust BLUE defocus according to the following specifications. 1mm on each side equaling 2mm total See figure Below.



WHITE BALANCE ADJUSTMENT

1. Screen adjustment
2. High brightness white balance
3. Low brightness balance

Screen Adjustment VRs	Drive Adjustment VRs
Red: on Focus Pack	Red: R829R on CRT P.W.B.
Green: on Focus Pack	Green: R879G on CRT P.W.B.
Blue: on Focus Pack	N/A

Adjustment VRs:

Screen adjustment VRs on Focus Block

Drive adjustment VRs on CRT P.W.B.

Red Drive = R829R

Green Drive = R879G

Preparation for adjustment

1. Start adjustment 20 minutes or more after the power is turned on.
2. Turn the brightness and black level OSD to minimum by remote control.
3. Receive a tuner signal, (any channel, B/W would be best).
4. Set the drive adjustment VRs (Red R829R and Green R879G) to their mechanical centers.

Adjustment procedure

1. Go to I²C ADJ. Mode. (With power ON, press DTV/SAT and Cursor Down buttons at the same time. Service Menu is displayed.)
2. Choose SERVICE item **Number [2]** of I²C ADJ. Mode. (Select ON by Cursor Right and the Vertical will collapses).
3. Gradually turn the screen adjustment VRs (red, green, blue) clockwise and set them where the red, green and blue lines are equal and just barely visible.
4. Return Service item on I²C ADJ to Off by Cursor Right. **Number [2]**.

Adjust the Sub Brightness **Number [1] SUBBRT** using I²C Bus alignment procedure so only the slightest white portions of the raster can be seen.

5. Input a gray scale signal into any Video input and select that input using the INPUT button on the remote or front control panel.
6. Turn the Brightness and Contrast OSD all the way up.
7. Make the whites as white as possible using the drive adjustment VRs (Red R829 and Green R879).
8. Set the Brightness and Contrast to minimum. (10800 Kelvin)
9. Adjust the low brightness areas to black and white, using screen adjustment VRs (red, green, blue).
10. Check the high brightness whites again. If not OK, repeat steps 6 through 9.
11. Press the **MENU** key on remote to Exit Service Menu.

CONVERGENCE ADJUSTMENT PROCEDURE

SUB BRIGHTNESS ADJUSTMENT

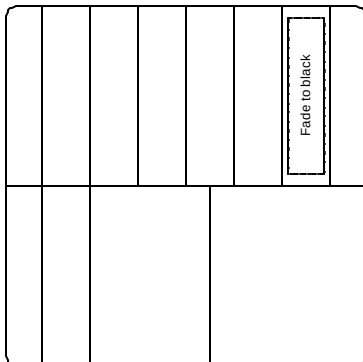
Adjustment preparation

1. Start adjustment 20 minutes or more after the power is turned ON. Receive the color bar signal.
2. Set the contrast and color controls to minimum.

Adjustment procedure

1. Go to "Sub Brightness" adjustment in VIDEO CHROMA ADJUST mode (press Source and Power button on Control panel at the same time), using ▲ ▼ buttons and then ► button.
2. Then adjust "Sub Brightness" using ◀ ▶ buttons to increase or decrease the value, according to figure. (Visually adjust).
3. After adjustment, press MENU button to exit VIDEO CHROMA ADJUST mode. (Data is stored in memory).

NOTE: When selecting SUB-BRIGHTNESS mode, the microprocessor sets the CONTRAST and COLOR to MIN. automatically, but make sure that the other conditions are center. Directly observe the screen by eye without using a mirror.



18 HORIZONTAL POSITION (FINE)

Adjustment Preparation:

1. Video Control: Brightness 90%, Contrast Max.

Adjustment Procedure

PROGRESSIVE MODE:

1. Receive any NTSC crosshatch signal.
2. Screen Format is **PROGRESSIVE**
3. Enter the I²C Bus alignment menu and select Item [12] **HPOSI**
4. Adjust the data so that the Left and Right hand side are equal.
5. Press the "MENU" button to exit from the Service Menu.

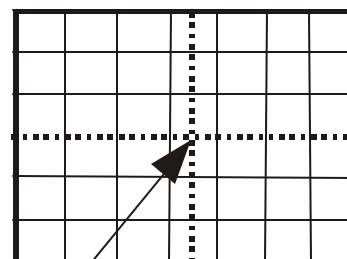
HD Mode Adjustment:

1. Receive any 2.14H 33.75kHz signal.
2. Display Format is **HD** mode.
3. Enter the I²C Bus alignment menu and select Item [12] **HPOSI**
4. Adjust the data using the left and right cursor keys and balance the Left and Right hand side.
5. Press the "MENU" button to exit from the Service Menu.

DIGITAL CONVERGENCE ADJUSTMENT

Adjustment preparation

1. Receive an RF or video signal.
2. Set controls to factory preset.
3. Install jig screen on the set.
4. Note the center of the video pattern displayed. This is necessary to match dotted lines (adjustment point viewed) and actual point that is adjusted and displayed by the video signal.
5. Press the service only switch (on POWER/DEFLECTION PWB). The pattern displayed is now the digital convergence mode.
6. When performing a complete digital convergence adjustment CLEAR DATA in RAM. See 2.6 (1)-(7).
7. To clear data turn TV set off. Press and hold the service switch and then press POWER on.



ADJUSTMENT POINT

NOTE: If only minor adjustments to convergence are needed, the jig screen is not necessary. Use digital data stored in memory and one color as a reference (red, green or blue). DO NOT CLEAR DATA and WRITE to ROM memory.

CONVERGENCE ADJUSTMENT PROCEDURE

CONVERGENCE POINT ADJUSTMENT

Adjustment preparation

1. Select color to adjust.
"DISPLAY"-Green
"0"-Red
"SOURCE"-Blue
2. Use 4,6,2, and 5 to move the cursor position(dotted lines).
3. Use cursor buttons to move the convergence point.
4. Three adjustment modes are available:
 1. (3x3) Press "DISPLAY" 5 times
(only works when DCU is in uncorrected state).
 2. (7x5) Press "0" 5 times
 3. (13x9) Press "SOURCE" 5 times

For touch-up, only the (13x9) mode is necessary. This will adjust every cross-hatch intersection point on the screen.

For complete adjustment, start with (3x3) mode. This will adjust center point and eight edge points only, but will greatly reduce adjustment time. Then use (7x5) mode, and finally (13x9) mode to finish convergence.

If "S" distortion appears between cross-hatch lines repeat (7x5) mode to change calculation process while adjusting to remove distortion, then return to(13x9) mode to finish touch-up convergence.

Adjustment procedure

1. Receive any NTSC signal.
2. Start adjustment at the center of the screen.
3. Continue adjustment at next closest position.
4. Adjust center area first, ending with edge sections.
5. When convergence is acceptable, press "-" to write data to ROM memory. ROM WRITE? is displayed to alarm system that ROM will be overwritten with new data. Press the "-" button again to write displayed data to ROM.
6. DATA WRITE TO ROM will take approximately 4 seconds and no picture will be displayed.
7. Green dots will be displayed when operation is completed.
8. Press MUTE to return to convergence pattern, then confirm again convergence is acceptable.

9. Press "-" (ROM write) mode.

HD MODE

Receive any HD signal and repeat progressize mode procedure.

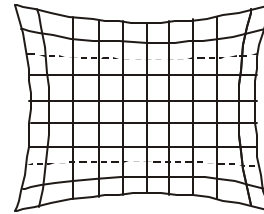
NOTES:

1. **Display only green for easier adjustment and match to jig screen. Press "MENU", THEN PRESS "DISPLAY".**
2. **Write Data to ROM after green adjustment. Once green has been confirmed to match jig screen, the jig screen can be removed. Do not readjust the green color after jig screen has been removed. This is now your reference color.**
3. **Display green and red only and match red to green.**
4. **Display all colors and match blue to green and red. Touch-up red color if necessary.**
5. **Existing DATA in ROM can be read by pressing the SWAP button 2 times. This data can be used after replacing a component(CRT,DY,etc.) Where complete convergence adjustment is not necessary be careful not to overwrite this data. DO NOT write cleared RAM data into ROM or a completec convergence adjustment will be necessary.**

WARNING: Advanced Convergence Adjustment Procedure is to be performed only when replacement of the Small Signal Main Module or one or more the the CRT's is replaced.

RASTER CENTERING

1. Press the **FREEZE** button to enter the Raster Phase Adjustment Mode. Two additional lines appear, one near the top, and one near the bottom of the screen.



Press the **MENU** button to see all colors if the center cross is other than White.

2. Press the **Cursor Keys** to match the selected color to the green at the geometric center of the screen.
3. Press the **RECALL, 0, or SOURCE** buttons to select the next color to be adjusted.
 - 0**= Red / Green (Yellow)
 - SOURCE**= Green / Blue (Cyan)
 - RECALL**= Green Only
4. Press **Freeze** button to exit the Raster Phase Mode. (The two lines disappear)

CONVERGENCE ADJUSTMENT PROCEDURE

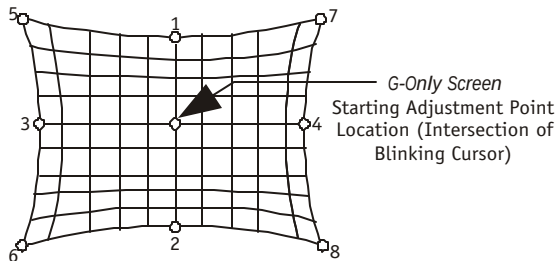
CONVERGENCE 3X3

Green 3x3 Mode Alignment

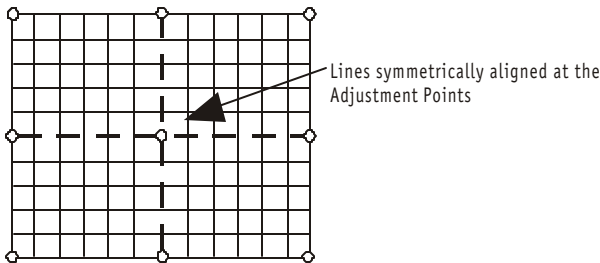
1. Start with power off, press the service button **SK01** and hold, then press the front panel **POWER** button at the same time. Set should come on with distorted convergence.

Note: Un-adjusted convergence will appear, DO NOT PRESS ROM WRITE ("MOVE" button twice). If you do so, you will save this un-adjusted convergence data.

2. Press **DISPLAY** button 5 times to access 3x3 Mode.
3. Press **2,3,4**, and **6** keys to select the center adjustment point (if not already selected).

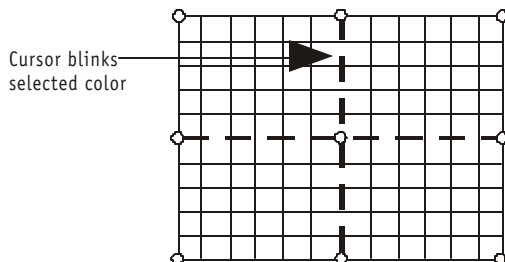


4. Press the **CURSOR KEYS** at the selected adjustment point to match the Green horizontal and vertical lines to the Screen Jig lines.



Red and Blue 3x3 Mode Alignment

1. Press the **0** key to project the **RED + GREEN** internal cross-hatch colors.



Internal cross-hatch is Yellow when the Red and Green lines match, and Cyan when the Blue and Green Match

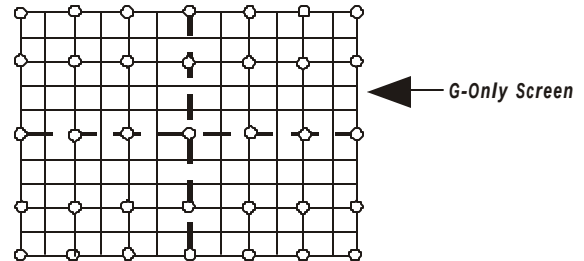
2. Press the **CURSOR** Keys at the selected adjustment point to match the **RED or BLUE** horizontal/vertical lines to the Green cross-hatch lines.
3. Press the **SOURCE** key to select the **BLUE** and **GREEN** cross-hatch colors. Perform step 2 and 3 for the **BLUE**

PRT.

CONVERGENCE 7X5

Green 7X5 Mode Alignment

1. Press the **0** button 5 times to enter the **7X5** Adjustment Mode.
2. Press the **MENU** button and then the **RECALL** button again to project the Green color only.
3. Repeat the same **3X3** steps 3 to 5 for the **GREEN** 7X5 Mode Adjustment.

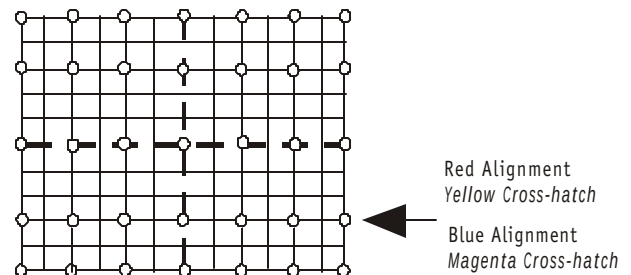


Red 7X5 Mode Alignment

1. Press the **0** key to select the **RED + GREEN** internal cross-hatch signal.
2. Repeat the **7X5** steps 2 to 3 for the **Red 7X5** adjustment.

Blue 7X5 Mode Alignment

3. Press the **AVX** key to select the **BLUE + GREEN** colors.
4. Repeat the **7x5** steps 2 to 3 for the **Blue 7X5** mode adjustments.

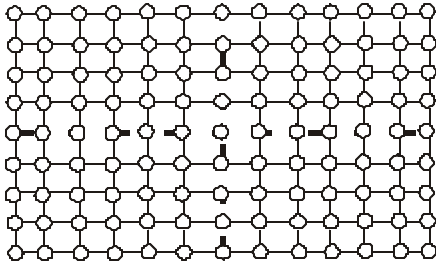


CONVERGENCE 13X9

Green 13X9 Mode Alignment

1. Press the **SOURCE** button 5 times to enter the **13X9** Mode.
2. Press the **MENU** button and then the **RECALL** button again to project the **GREEN PRT** only.

CONVERGENCE ADJUSTMENT PROCEDURE



13x9 Mode = 117 Adjustment Pos
... Linear Block = true

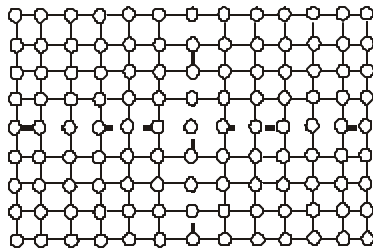
3. Repeat the same **3X3** steps 3 to 5, for the Green 13X9 Mode Adjustment.

Red 13X9 Mode Alignment

1. Press the **0** key to select the **RED + GREEN** internal cross-hatch signals.
2. Repeat the **7x5** steps 2 to 3 for the **Red 13X9** mode adjustments.

Blue 13X9 Mode Alignment

3. Press the **SOURCE** key to select the **BLUE + GREEN** colors.
4. Repeat the **7x5** steps 2 to 3 for the **Blue 13X9** mode adjustment.



Red Alignment
Yellow Cross-hatch
Blue Alignment
Magenta Cross-hatch

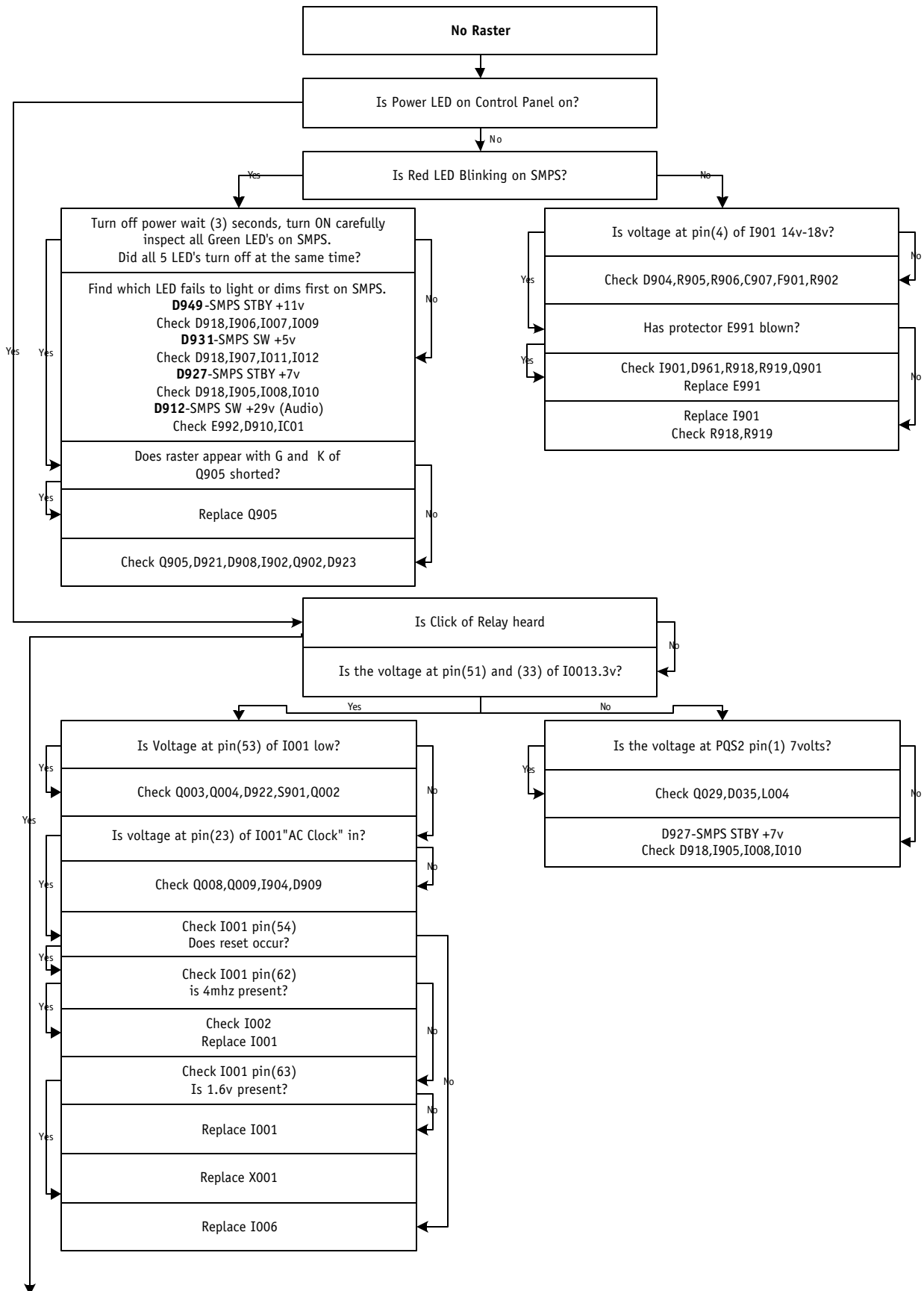
ROM WRITE

Storing the New Data

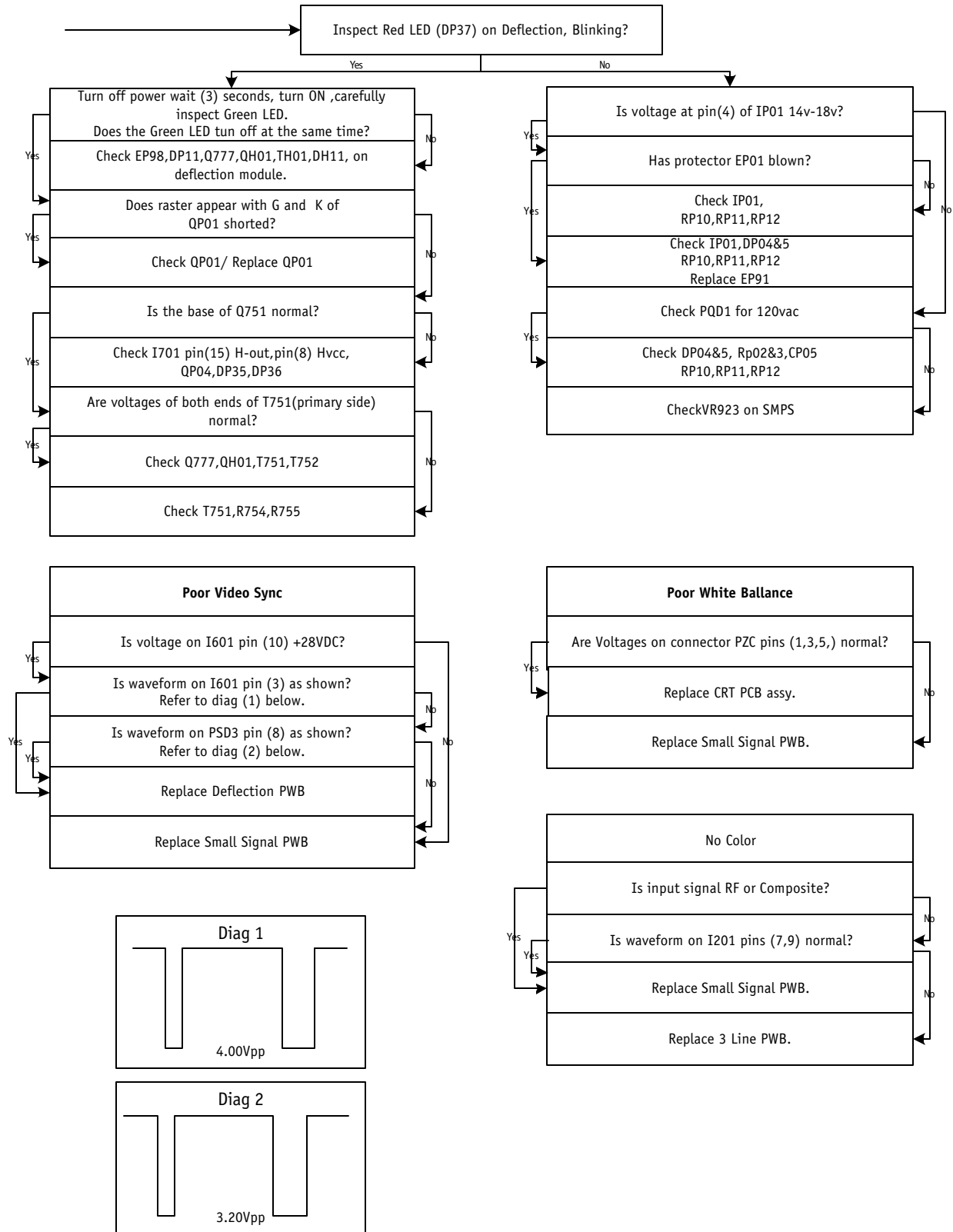
Press the **"-"** button twice to store the convergence data in the EPROM. (Screen goes blank for 4 seconds)

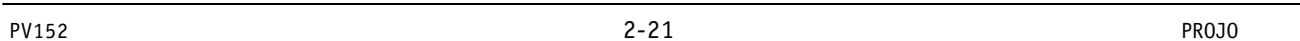
1. 1st press of **"-"**
2. 2nd press of **"-"**
3. Operation complete (Green Dots appear after completion of operation).

TROUBLESHOOTING

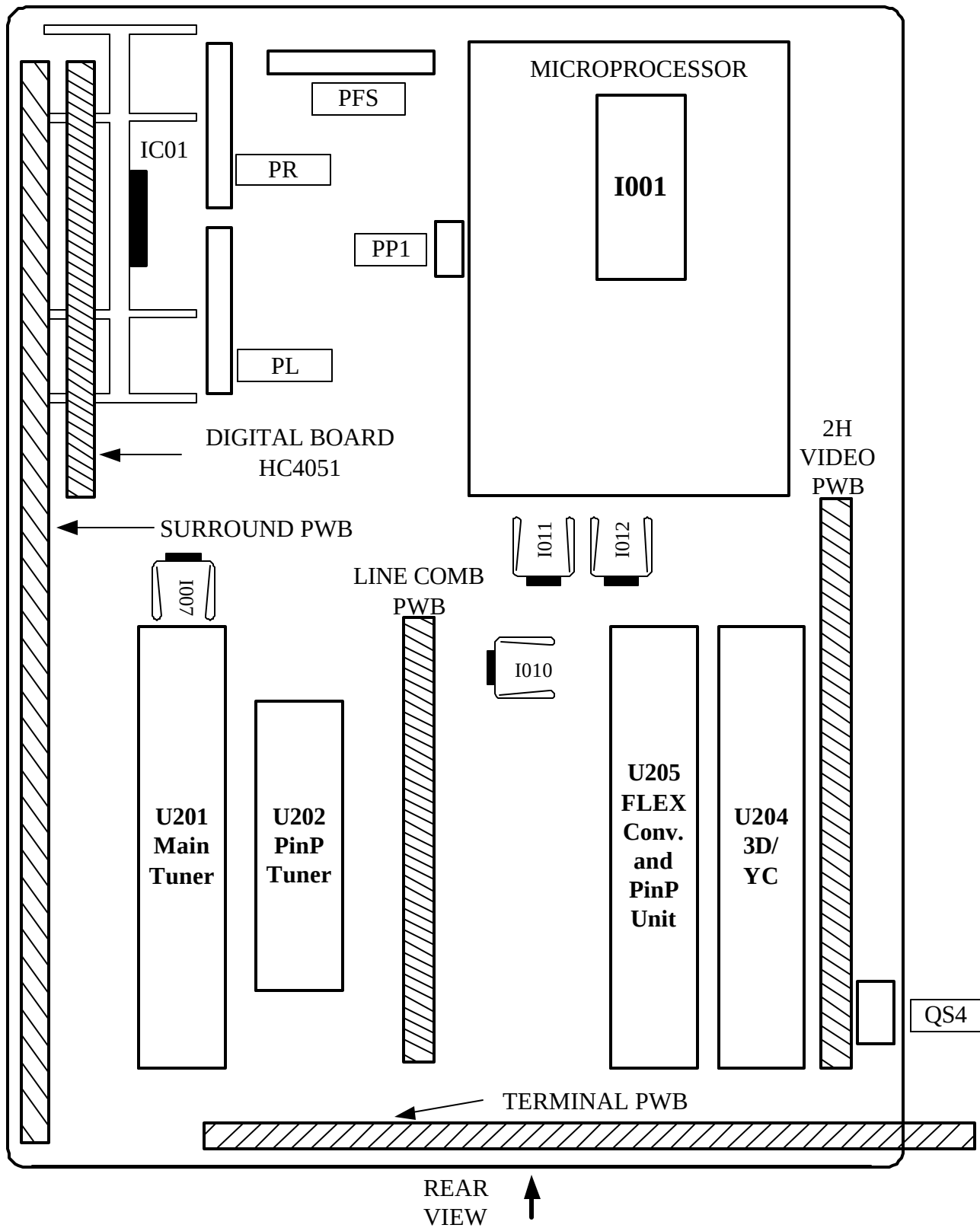


TROUBLESHOOTING

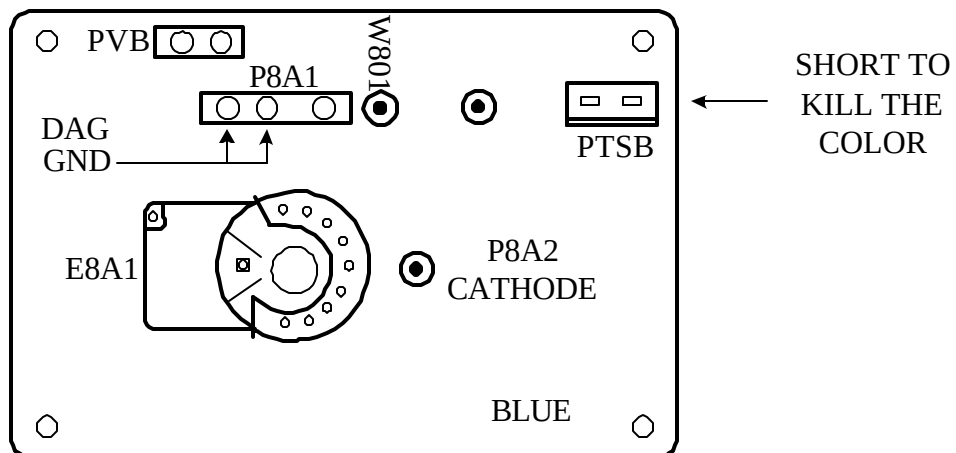
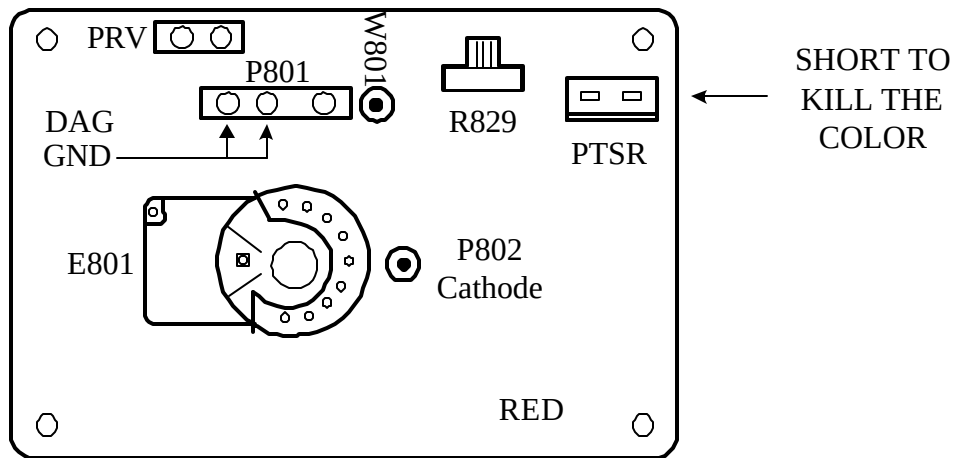
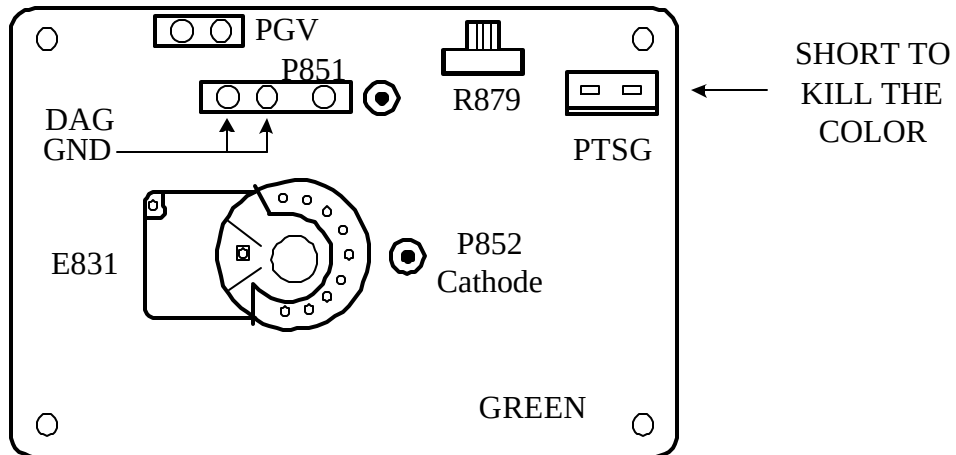




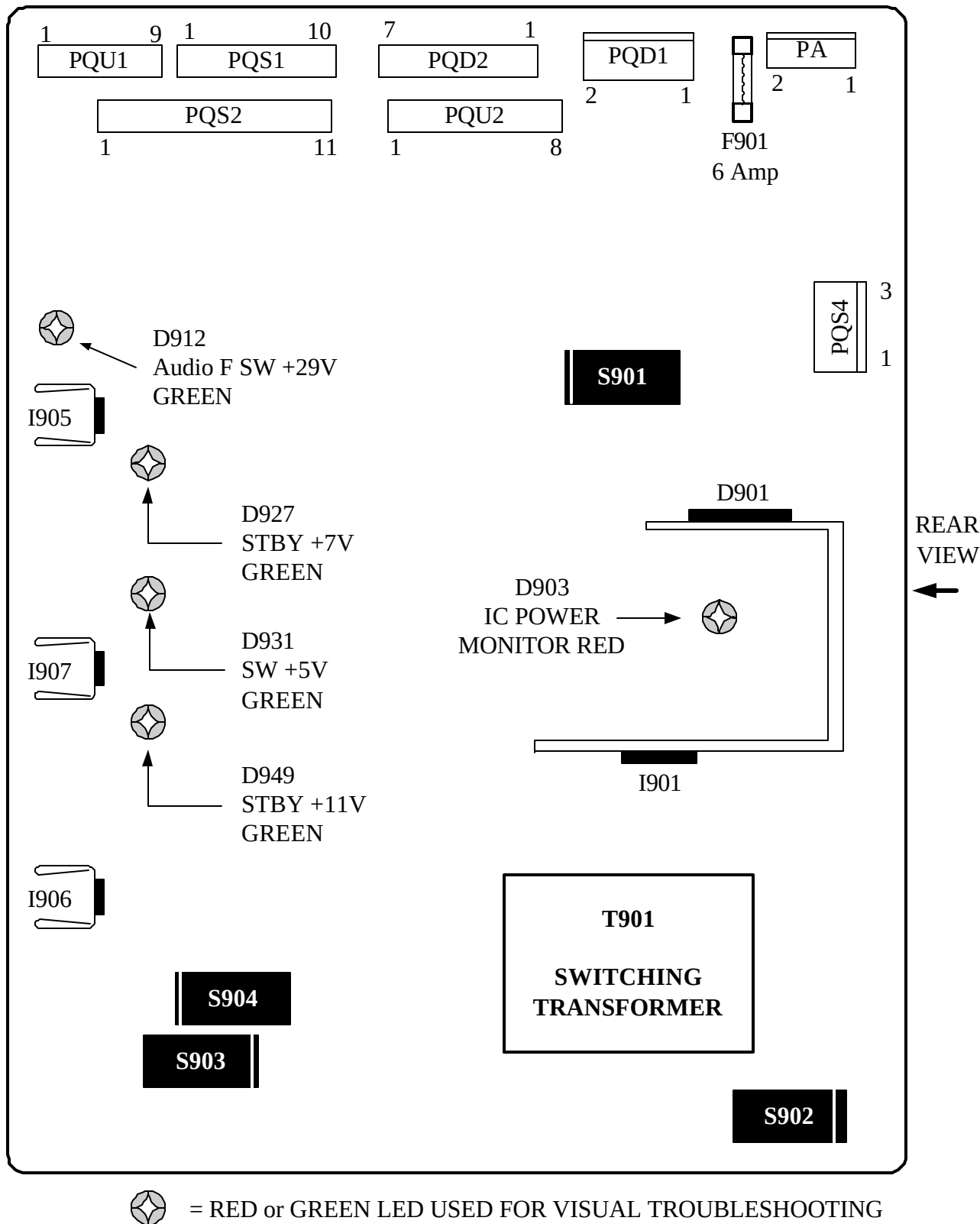
SMALL SIGNAL P.W.B. DIAGRAM

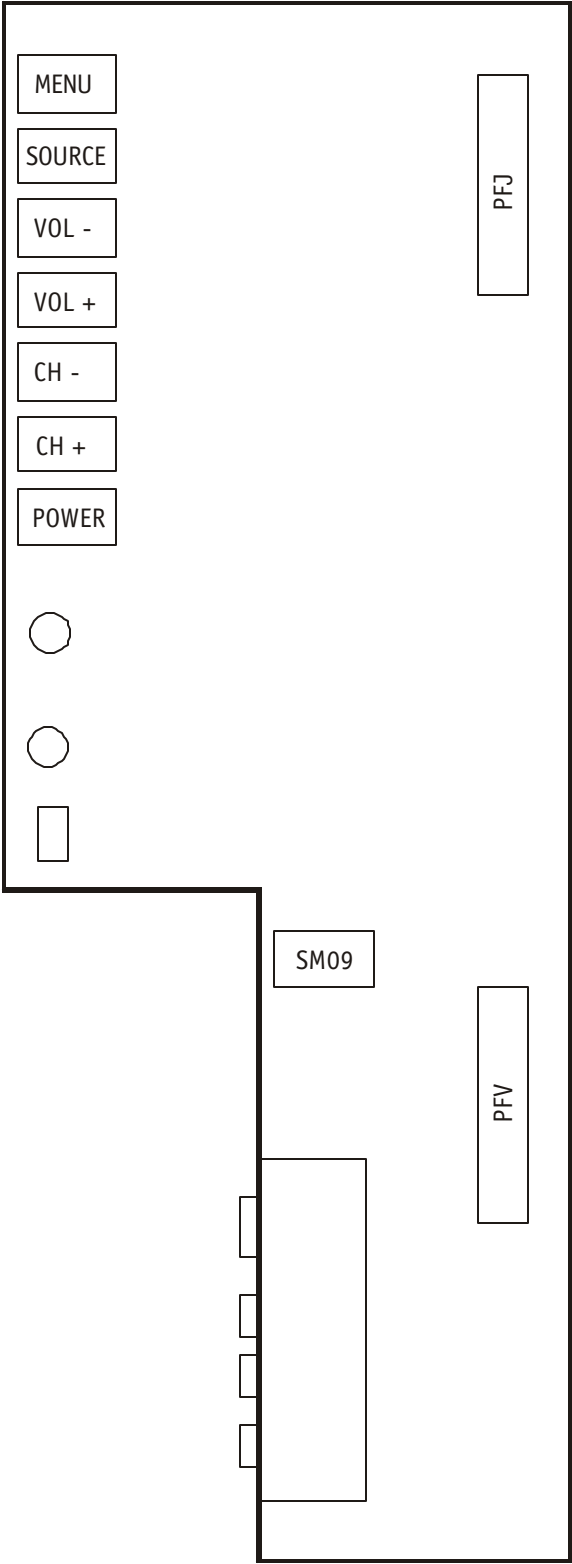


CRT AND CONTROL P.W.B. DIAGRAM



CHASSIS POWER SUPPLY P.W.B.





CIRCUIT DESCRIPTION

POWER SUPPLY OPERATION EXPLANATION

POWER ON AND OFF

The power supply in the ZP94 & 95 chassis works very similar to the previous models, with only a few exceptions. This power supply runs all the time when the AC is applied. The use of the power supply creating Standby Voltage supplies eliminates the need for a Standby transformer. The following explanation will describe the Turning ON and OFF of the projection television. The Microprocessor I001 generates the ON-OFF control signal from pin (53). The logic states of this pin are High = On and Low = Off. When the set is turned On, the high from pin (53) is routed to the Relay Driver Q002 base. This turns on Q002 and its collector goes low. This On/Off from the Relay Driver Q002 will perform the following :

- Turns on the SW5+V I907 and SW+12V I908 regulators. Which do not operate in Standby.
- Turns on the Shut Down "Power Shorted" detection circuit, Q908 and Q909.
- Turns on the Horizontal Vcc supply to the Horizontal and Vertical drive IC, I701.
- Turns on the Relay providing AC to the Deflection Power Supply on the Power/Deflection PWB.

B+ GENERATION FOR THE SUB POWER SUPPLY DRIVER IC:

Vcc for the Driver IC is first generated by the AC input. This voltage is called Start Up Voltage. I901 requires 21V DC to operate normal. However, it will begin operation at 14.5V DC on pin (4) of I901. When AC is applied, AC is routed through the main fuse F901 (a 5 Amp fuse), then through the Line filters L901, 902, 903 and 904 to prevent any internal high frequency radiation from radiating back into the AC power line. After passing the filters it arrives at the main full wave bridge rectifier D901 where it is converted to DC voltage. One leg of the AC is routed to a half wave rectifier D902 where it is rectified, routed through R905 and R906 (both a 5.6K ohm resistor), filtered by C907, clamped by a 30V Zener D904 and made available to pin (4) of I901 as start up voltage. The Red LED D903 is illuminated by this power supply. When this voltage reaches 14.4Vdc, the internal Regulator of I901 is turned On and begins the operation of I901. The primary control element of the power supply is I901 (the Switching Regulator IC), in conjunction with transformer T901. These two components, along with the supporting circuitry, comprise a closed loop regulation system. Unlike previous Pulse Width Modulated (PWM) Switch Mode power supplies, the regulation system in the this chassis utilizes Frequency Control Modulation with an operational frequency of 85KHZ to 100KHZ, corresponding to full load and no load conditions, respectively. Primary regulation is provided by Q902, I902 and Q910, regulating the switching frequency at pin (3) of I901 via pin 1, the regulation in-

put to the IC. Three primary voltages are developed that are needed to sustain run, maintain regulation, and support shutdown circuitry; Run Voltage generated from pin (8 and 9) of T901, +28V used for regulation, and STBY +11V, respectively. The "STBY" represents "always on, designating a supply that is active whenever the unit is connected to AC power. The Power Supply utilizes a Shutdown circuit that can trigger Q905 from 16 input sources. (6 of these are not operational in Standby mode). I903 is activated by Q905, applying gate voltage to Q901, which grounds out the Vcc at pin (4) of I901, disabling the power supply.

Audio Front 29V Regulator SW+29V indicated by D912: The Audio Front 29V supply is generated from pin (17) of T901. This output is protected by E992, rectified by D910 and filtered by C918. This supply is routed to the Rear Audio Output IC IC01. This voltage is what illuminates the Green Visual Trouble Shooting LED, D912.

STBY+11V Regulator I906 indicated by D949: The STBY+11V supply is generated from pin (11) of T901. This output is rectified by D918 and filtered by C928. This supply is routed to the Stand By +11 Regulator I906 pin (1). This voltage is what illuminates the Green Visual Trouble Shooting LED, D949.

STBY+7V Regulator I905 indicated by D927: The STBY+7V supply is generated from pin (11) of T901. This output is rectified by D918 and filtered by C928. This supply is routed to the Stand By +7 Regulator I905 pin (1). This voltage is what illuminates the Green Visual Trouble Shooting LED, D927.

The sub power supply in the ZP94 & 95 chassis works very similar to the previous models, with some very significant exceptions. This power supply runs at 50% efficiency when the AC is applied with the set OFF. The use of the power supply creating the STBY+11V supply eliminates the need for a Standby transformer. The following explanation will describe the Turning ON and OFF of the projection television.

POWER SUPPLY OPERATIONAL FREQUENCY DURING STANDBY:

When the Horizontal deflection is defeated, the power supply no longer has a deflection load. This low current demand is detected by the three resistors connected to the source of the internal Switch MOS FET inside I901 via pin (2). Pin (1) of I901 is the over current detection pin, however it is also the current demand sensing pin. When the current demand is low due to horizontal defeat, pin (1) will be less than 1.4V and the internal frequency will switch to 200Khz. This is caused by the Quasi Resonant circuit operation. This reduction of power supply frequency will move the frequency above the Bell of the power supply transformer and all secondary voltages will reduce to approximately 1/2 of their normal voltage. Due to the fact that the power

CIRCUIT DESCRIPTION

supply is still operating at 1/2 voltage output, the Green LEDs used for visual trouble sensing will reduce in intensity, however they will remain lit. With the exception of the SW+12V and SW+5V regulator. Which are turned off in Stand By.

POWER SUPPLY FREQUENCY OF OPERATION DURING RUN:

When the Horizontal deflection is in operation, the power supply frequency fluctuates in accordance to screen brightness, causing differing demands for High Voltage replacement. The normal operational range for the power supply is between 80 KHz to 100 KHz. The lower the frequency, the higher the current supplied to the load. During Stand-By, it operates at 200KHz.

AC LOSS DETECTION:

AC is monitored by the AC Loss detection circuit. The AC input from PQS1 pin (10) is rectified by DN09. This charges up C009 and through DN08 it charges C008. When AC is first applied, C008 charges slightly behind C009 preventing activation of Q001. If AC is lost, C009 discharges rapidly pulling the base of Q001 low, however DN08 blocks C008 from discharging and the emitter of Q001 is held high. This action turns on Q001 and produces a high. This high is routed through D029 to the base of Q022 turning it ON. The collector goes low and pulls the base of Q023 low turning it ON. The emitter of Q023 is connected to STBY +11V, so when it turns ON, its collector output goes HIGH. This high is now called V Mute 1.

SW+9V AND SW+5V REGULATOR OPERATION IN STAND-BY:

Both of these ICs as well as the STBY+11V and the STBY+7V regulators are DC to DC converters just like last year. This is because of the wide range of input voltages from Stand-By to Normal operation of the Power Supply. The SW+12V regulator (I908) and the SW+5V regulator (I907) are shut off during Stand-By mode. This is accomplished by Q002 and Q903. When the High for the power On/Off pin (53) of the Microprocessor is inverted by the relay driver Q002, and routed through the PQS1 connector pin (8). It is detected by Q903, its collector will go low. This will pull pin (5) of I907 and I908 low, turning off the two DC to DC converters.

SHUT DOWN CIRCUIT:

Shut down occurs when the shutdown SCR Q905 is activated by gate voltage. When Q905 receives gate voltage of 0.6V, the SCR fires and give a ground path for the emitter of the LED inside I903. The light produced by turning on this LED turns on the internal photo receiver and generates a high out of pin (3). This high is routed to the gate of Q901 turning it on. This grounds pin (4) of I901 removing Vcc and the power supply stops working. The reason for the photo sensor I903 is to isolate hot and cold ground.

SOME SHUT-DOWN DETECTION CIRCUITS SHUT OFF DURING STAND-BY:

During Stand-By, all of the secondary voltages are reduced to approximately 50% of their normal voltage, except the STBY voltages. This could cause a potential problem with the Short Detection circuits for shutdown. To avoid accidental shut down, Q903 also controls the activity of Q908 and Q909. During Stand-By, Q903 is turned On. This allows the Base of Q908 to be pulled through D945. This action turns off Q908. When Q908 is off, it doesn't supply emitter voltage to the collector of Q909. The base of Q909 is connected to 6 Low Detection in-puts. When the power supply operates at 50%, the Short Detection circuit could activate. By turning off Q909, no accidental shut down operation can occur.

SUB POWER SUPPLY VISUAL LEDs:

ZP94 & 95 Chassis has 5 Green and 1 Red LED on Sub Power Supply PWB. This chassis utilizes 5 Green LED's in the power supply cold side and a Red LED in the HOT side. The power supply operates in two different modes, Standby and in Projection On mode.

TURNING ON THE DEFLECTION POWER SUPPLY

When the Projection Television is turned on, the Microprocessor outputs a high for Pin (35) which is inverted by Q002. This low is routed through the connector PQS1 pin (8) on the signal PWB to the Sub Power Supply PWB. It is then routed to Q903, its collector will go High. This will pull up pin (5) of I907 and I908, turning ON the two DC to DC converters. The output of both DC to DC converters I907 and I908, are used by the relay which supplies AC voltage to the Deflection Power Supply on the Power/Deflection PWB. The output of I907 SW+5V regulator supplies B+ for pin (3) of the relay S901. The output of I908 SW+12V drives the base of Q911 turning it On and grounding pin (4) of the relay S901. The relay now provides AC to the bridge rectifier on the Deflection Power Supply.

HORIZONTAL B+ ON AND OFF CIRCUIT:

When the power supply goes into Stand-By mode (TV Off), the Horizontal Drive signal for deflection is shut off. This is accomplished by Q002 and QP04. The Low out produced from the Power On/Off pin 53 of the Microprocessor routed through Q002 located on the Signal PWB. This Low is sent through the PQS1 connector pin (8) to the Sub Power Supply PWB and then through PQD2 connector pin (1) and sent to the Deflection PWB. This Low is detected by the base of QP04 turning it ON and the SBY +11V connected to its emitter is made available at its collector. The collector is connected to the Deflection B+ pin (22) of the Horizontal and Vertical Drive IC, I701 via pin (8). This action stops I701 from producing a horizontal deflection drive signal.

CIRCUIT DESCRIPTION

HIGH VOLTAGE DRIVE CIRCUIT:

When QN04 is turned on, the 11V standby will also be applied to the High Voltage Drive IC IH02 pin 14 via RN15 and DN13. When this occurs, the IC will stop generating the drive signal that is used to produce High Voltage via QH08, the High Voltage Driver. Again, this is done to prevent CRT burn, especially during sweep loss.

GREEN LED:

The Deflection B+ 120V supply is generated from pin (13) of TP91. This output is rectified by DP11 and filtered by CP17. This supply is routed to the Horizontal Drive Circuit and the High Voltage generation circuit. This voltage is what illuminates the Green Visual Trouble Shooting LED, DP29

POWER SUPPLY SHUTDOWN EXPLANATION

This chassis utilizes IP01 as the Osc.\Driver \Switch for the Deflection power supply, just as the previous chassis have done. This IC is very similar to the previous versions, however it does differ in Frequency (described previously). The Shutdown circuit (cold ground side detection), is used to turn off the Relay S901 via the following circuit, QP01 (the Shutdown SCR), Connector PQD2, Q911 the Relay Driver and the Relay S901. The Power Supply utilizes a Shutdown circuit that can trigger QP01 from 14 input sources. When any of these inputs cause a high on the gate of QP01, the relay disengages, disabling the deflection power supply. All of the Power Supply Shutdown circuitry can be broken down into the following five groups;

SHUT DOWN CIRCUIT:

Shut down occurs when the shutdown SCR QP01 is activated by gate voltage. When QP01 receives gate voltage of 0.6V, the SCR fires and give a ground path for the pin (5) of Connector PQD2 called PROTECT. This Low is routed to the Sub Power Supply PWB and is impressed on the base of the Relay Driver Transistor Q911 turning it Off. When Q911 turns Off the Relay S901 will disengage and remove the AC source from the Deflection Power Supply.

VOLTAGE LOSS DETECTION

1. Shorted 220V (DP31 and DP32) Inverted by QP03 then through DP22 The cathode of DP31 is connected directly to the 220V line. If it shorts this circuit is activated and pulls the base of QP03 low. This output High is routed through DP22 to the gate of the Shut Down SCR QP01.
2. Shorted SW+8V (DP33) Inverted by QP03 then through DP22 The cathode of DP33 is connected directly to the SW+8V line. If it shorts this circuit is activated and pulls the base of QP03 low. This output High is routed through DP22 to the gate of the Shut Down SCR QP01.
3. Shorted 28V (DP30) Inverted by QP03 then through

DP22 The cathode of DP30 is connected directly to the 28V line. If it shorts this circuit is activated and pulls the base of QP03 low. This output High is routed through DP22 to the gate of the Shut Down SCR QP01.

4. Shorted Side Pin Cushion Circuit (D760 and Q754) then through DP34 The Side Pin Cushion circuit is comprised of I651, Q652 through Q657 If a problem occurred in this circuit that creates a Low on the cathode of D760, the low will be routed to the base of Q754, turning it Off. This output High is routed through DP34 to the gate of the Shut Down SCR QP01.
5. Shorted Deflection Transformer or Misoperation (D756 and Q754) then through DP34 The Deflection circuit generates the actual Drive signal used in the High Voltage section. If a problem occurs in this circuit, the CRTs could be damaged or burnt. D757 is connected to D759 which is normally rectifying pulses off the Deflection Transformer T753. This rectified voltage is normally sent through D757, D756 to the base of Q754 keeping it On and it's collector Low. If the Deflection circuit fails to produce the pulses for rectification, the base voltage of Q754 disappears and the transistor turns Off generating a High on its collector. This output High is routed through DP34 to the gate of the Shut Down SCR QP01.
6. Heater Loss Detection (DH26, DH27, QH07 and DP34) This voltage does not go to the CRTs. The Flyback Transformer TH01 generates a pulse called Heater. (Note: This does not go to the CRTs as heater voltage, it's used for Excessive High Voltage Detection. If a problem occurs in this circuit, the Ex-cessive High Voltage Detection circuit wouldn't operate. It would be possible for there to be High Voltage but the circuit detecting Excessive High Voltage couldn't work. DH26 is connected to DH24 which is normally rectifying pulses off the Flyback Transformer TH01. This rectified voltage is normally sent through DH26, DH27 to the base of QH07 keeping it On and its collector Low. If the Heater Pulse fails to produce the pulses for rectification, the base voltage of Q754 disappears and the transistor turns Off generating a High on its collector. This output High is routed through DH30 to the anode of DP34 to the gate of the Shut Down SCR QP01.

NEGATIVE VOLTAGE LOSS DETECTION:

7. -M28V Loss Detection (DP23, DP24) RP31 (18K ohm) is connected to the negative -M28V line and RP30 (22K ohm) is connected to the positive +29V line. The Cathode of DP23 monitors the neutral point where these two resistors are connected. If the negative voltage disappears, the zener DP23 fires. This high is routed through DP24 to the gate of the Shut Down SCR QP01 and Shut Down occurs.
8. SW-8V Loss Detection (DP28, DP29) RP26 (3.3K ohm) is

CIRCUIT DESCRIPTION

connected to the negative SW-8V line and RP25 (3.3K ohm) is connected to the positive SW+8V line. The Cathode of DP28 monitors the neutral point where these two resistors are connected. If the negative voltage disappears, the zener DP28 fires. This high is routed through DP29 to the gate of the Shut Down SCR QP01 and Shut Down occurs.

EXCESSIVE CURRENT DETECTION:

9. 120V Deflection Power Supply (RP17, QP02, DP15, DP16 and DP18) If an excessive current condition of the Deflection B+ is detected by RP17 a 0.47 ohm resistor, the base of QP02 would drop. This would turn on QP02 and the high produced at the collector would fire zener DP15. This High would be routed through DP16 through DP18 to the gate of the Shut Down SCR QP01 and Shut Down occurs.
10. 28V Vertical IC I601 Power Supply (R645, Q609, D615, and DP34) If an excessive current condition of the Vertical B+ is detected by R645 a 0.68 ohm resistor, the base of Q609 would drop. This would turn on Q609 and the high produced at the collector would be routed through D615 through DP34 to the gate of the Shut Down SCR QP01 and Shut Down occurs.

VOLTAGE TOO HIGH DETECTION:

11. Excessive High Voltage Detection (DH31, RH54, RH55 and DH24). Sensed from the Heater Voltage generated from pin (5) of the Flyback Transformer TH01. Also, (DH42) sends a high command to the Horizontal Driver IC IH02, to defeat Horizontal Drive Output The Flyback Transformer TH01 generates a pulse called Heater. (Note: This does not go to the CRTs as heater voltage, its used for Excessive High Voltage Detection). If this voltage goes too high indicating an excessive High Voltage condition, the voltage divider comprised of RH54 and RH55 would impress a high on the cathode of DH31. This high is routed through DH34 to the gate of the Shut Down SCR QP01 and a Shut Down occurs.
12. Side Pincushion failure generating a High. (D754, and D753) The Side Pin Cushion circuit is comprised of I651, Q652 through Q657 If a problem occurred in this circuit that creates a High on the cathode of D754, the High will be routed through D753 to the gate of the Shut Down SCR QP01.
13. Deflection B+ Too High. (DP17, RP21 and RP22) RP21 and RP22 form a voltage divider. The top side of RP22 is monitored by DP17. If this voltage goes too high, zener DP17 will fire. This high is routed through DP18 to the gate of the Shut Down SCR QP01 and Shut Down occurs.
14. Heater Voltage from the Deflection Power Supply Too High Detection. (DP27 and DP28) The Heater Voltage for the CRTs filament is generated in the Deflection Power

Supply. This voltage is monitored by DP27. If this voltage goes too high, zener DP27 will fire. This high is routed through DP28 to the gate of the Shut Down SCR QP01 and Shut Down occurs.

ABL CIRCUIT

The ABL voltage is generated from the ABL pin of the Flyback transformer, TH01. The ABL pull-up resistors are RH58 and RH59. They receive their pull up voltage from the B+ 120V(V2) for Deflection line generated from the Power Supply via TP91 pin 13, rectified by DP11, filtered by CP33 and then routed through the excessive current sensing resistor RP17.

ABL VOLTAGE OPERATION:

The ABL voltage is determined by the current draw through the Flyback transformer. As the picture brightness becomes brighter or increases, the demand for replacement of the High Voltage being consumed is greater. In this case, the flyback will work harder and the current through the Flyback increases. This in turn will decrease the ABL voltage. The ABL voltage is inversely proportionate to screen brightness. Also connected to the ABL voltage line is DH33. This zener diode acts as a clamp for the ABL voltage. If the ABL voltage tries to increase above 12V due to a dark scene which decreases the current demand on the flyback, the ABL voltage will rise to the point that DH33 dumps the excess voltage into the 12 line.

ACCL TRANSISTOR OPERATION:

The ABL voltage is routed through the PSD3 connector, through the PSZ2 connector, to the base of QX13. Under normal conditions, this transistor is nearly saturated. QX13 determines the voltage being supplied to the cathode of DX05, which is connected to pin 45 of the Jungle IC, IX01. During an ABL voltage decrease, due to an excessive bright circumstance, the base of QX13 will go down, this will drop the emitter voltage which in turn drops the cathode voltage of DX05. This in turn will pull voltage away from pin 45 of the jungle IC, IX01. Internally, this reduces the contrast and brightness voltage which is being controlled by the I C bus data communication from the Microprocessor arriving at pin 27 and 28 of the jungle IC and reduces the overall brightness, preventing blooming.

SPOT CIRCUIT:

When QN04 is turned on, the 11V standby will be applied to the anode of DN11, forward biasing it. This voltage will then pass through DN11, get zenered by DN09, and go to pin 2 of PSD3, where it will activate the Video Mute circuitry Q022 - Q024 on the Signal PWB. This is done to prevent CRT burn. Another input to this circuit is the I701 DAC3 line. This will activate when accessing certain adjustment parameters in the service mode; i.e. turning off vertical drive for making CRT drive or cut-off adjustments.

CIRCUIT DESCRIPTION

SPOT PROTECT or SPOT KILLER:

As mentioned earlier, when the deflection power supply goes into shutdown for whatever reason, a low potential will be applied at the cathode of DN14, forward biasing it and causing current flow through RN07. Once again, this increase of current flow through RN07 will bias on QN04 and the events described previously will occur.

SWEEP LOSS DETECTION:

The key component in the Sweep Loss Detection circuit is QN04. This transistor is normally biased off. When the base becomes more negative, it will be turned on, causing the Standby 11V to be applied to two different circuits, the Spot circuit and the High Voltage Drive circuit.

VERTICAL / HORIZONTAL BLANKIN:

Loss of Vertical Blanking:

When the 24Vpp positive vertical blanking pulse is missing from the base of QN01, it will be turned off, which will cause the collector to go high. This in turn will cause QN02 to turn on, creating an increase of current flow from emitter to collector and up through RN07, (which is located across the emitter base junction of QN04), to the 11V standby supply. This increase of current flow through RN07 will bias on QN04 and the events described previously will occur.

Loss of Horizontal Blanking:

When the 11.6Vpp positive horizontal blanking pulse is missing from the base of QN05, it will be turned off, which will cause the collector to go high. This in turn will cause QN03 to turn on, creating an increase of current flow from emitter to collector, through RN06, and up through RN07. Again, this increase of current flow through RN07 will bias on QN04 and the events described previously will occur.

CONCERNING QN04:

There are several factors that can affect the operation of QN04; namely loss of vertical or horizontal blanking and spot killer or spot protect from a shutdown in the deflection power supply.

MICRO PROCESSOR DATA COMMUNICATION

The Microprocessor must keep in communication with the Chassis to maintain control over the individual circuits. Some of the circuits must return information as well so the Microprocessor will know how to respond to different request. The Microprocessor uses a combination of I²C Bus communication and the Standard Data, Clock and Load lines for control. The I²C communication scheme only requires 2 lines for control. These lines are called SDA and SCL. System Data and System Clock respectively. The Microprocessor also requires the use of what are called Fan Out ICs or DACs, (Digital to Analog Converters). This allows the Microprocessor to use only two lines to control many differ-

ent circuits. Also, due to the fact that this Microprocessor operates at the new 3.3Vdc voltage, it requires a Level Shift IC to bring up the DC level of the control lines to make it compatible with the connected ICs.

ON THE SIGNAL PWB:

Main Tuner U201:

The Microprocessor controls the Main Tuner by Clock, Data and Enable lines. Clock, Data and Enable lines for the Main Tuner are output from the Microprocessor at pins (20 Clock, 21 Data and 44 FEENABLE1) respectively. Pin (44) FEENABLE1 goes directly to the Main Tuner at pin (6), where as the Clock and Data lines must be routed through the Level Shift IC I014 to be brought up to 5V. Clock and Data from the Microprocessor arrive at I014 (Level Shift) at pins (2 and 3) and are output at pins (18 and 17). They arrive at the Main Tuner at pins (4 and 5).

PIP Tuner U202:

The only difference for the PinP tuner control lines is related to the PinP Enable line. This is output from the Microprocessor pin (43 FEENABLE2) to the PinP Tuner at pin (17). Clock and Data are the same as for the Main Tuner.

EEPROM I002:

The EEPROM is ROM for many different functions of the Microprocessor. Channel Scan or Memory List, Customer set ups for Video, Audio, Surround etc... are memorized as well. Also, some of the Microprocessors internal sub routines have variables that are stored in the EEPROM, such as the window for Closed Caption detection. Data and Clock lines are SDA1 from pin (2) of the Microprocessor to pin (5) of the EEPROM and SCL2 from pin (3) of the Microprocessor to pin (6) of the EEPROM. Data travels in both directions on the Data line.

Flex Converter U205:

The projection television is capable of two different horizontal frequencies. 31.75Khz for everything except HD and 33.75Khz for HD. (High Definition). The Flex Converter is responsible for receiving any video input and converting it to the related output. This output is controlled by sync and by the customer's menu and how it is set up. The set up can be 4X3 or 16X9, sometimes called letterbox. The Flex Converter can take any NTSC, S-In, Component in NTSC, Progressive, Interlaced, 480I, 720P, 1080I signal. Control for the Flex Converter is Clock, Data and Enable lines. Clock, Data and Enable lines for the Flex Converter are output from the Microprocessor at pins (20 Clock, 21 Data and 46 FCENABLE). FCENABLE Clock and Data lines must be routed through the Level Shift IC I014 to be brought up to 5V. They arrive at I014 at pins (2 Clock, 3 Data and 4 FCENABLE) and are output at pins (18, 17 and 16) respectively.

CIRCUIT DESCRIPTION

DAC1 I003 and DAC2 I004:

These Digital to Analog converter acts as an extensions of the Microprocessor(Sometimes called an Expansion ICs). The purpose of these ICs are to reduce the number of pins, (fan out) of the Main Microprocessor I001. The Main Microprocessor send Clock and Data via I2C bus to the DAC1 IC. The output from the Microprocessor is pin (2 SDA1 and 3 SCL1) which arrives at the DAC1 and DAC2 ICs at pins (5 and 6) respectively.

Level Shift I014:

The Microprocessor operates at 3.3VDC. Most of the Circuits controlled by the Microprocessor operate at 5VDC. The Level Shift IC steps up the DC voltage to accommodate.

ON THE DEFLECTION PWB:

Sweep Control I701:

The Sweep Control IC is responsible for generating Horizontal Drive and Vertical Drive signals. The Microprocessor must tell the IC when certain things are done in the Service Menu. When Cut Off is performed, the Vertical is collapsed. The Microprocessor tells I701 to stop producing Vertical Drive. At the same time, I701 must stop the Spot Killer circuit from operating. This is accomplished by placing pin (24 DAC3) high which activates QN07 which inhibits its spot killer high. Also, when H.Phase is adjusted, the Microprocessor controls the H. Drive signals phase in relationship to H.Blk which is timed with video sync. This gives the appearance that the horizontal centering is being moved. Communication from the Microprocessor via pins (59 SDA2 and 60 SCL2) to the PSD2 connector pins (2 and 3) and then to I701 pins (16 and 17) respectively.

ON THE SUB VIDEO PWB (2H VIDEO):

Jungle IX01:

The Video Processing IC is responsible for controlling video/ chroma processing before the signal is made available to the CRTs. Some of the emphasis circuits are controlled by the customer's menu. As well as some of them being controlled by AI, (Artificial Intelligence). Communication from the Microprocessor via pins (59 SDA2 and 60 SCL2) to the PSZ2 connector pins (1 and 2) and then to IX01 pins (27 and 26) respectively.

MICROPROCESSOR AS THE SOURCE FOR OSD:

The Microprocessor receives information related to timing for H. Blanking and V. Blanking. These arrive at pins (49 and 55) respectively. The Microprocessor determines the position for each display using these signals as a timing pulse. When it's necessary, the Microprocessor generates 1uSec pulses from pins (37 Red, 38 Green and 39 Blue) that are routed through the PSZ1 connector pins (14 Red, 16 Green and 18 Blue) and then through (QX07 Red, QX08

Green and QX09 Blue) and then sent to the Jungle IC IX01 pins (39 Red, 38 Green and 37 Blue) as OSD signals. When the OSD signals are high, they turn on the output of the Red or Green or Blue chroma amps inside the jungle IC and output a pulse to the CRTs to generate that particular character in the particular color. HALF TONE PIN (40): This pin is responsible for controlling the background transparency of the Main Menu. When the customer calls up the Main Menu, they can select the CUSTOM section. Within the CUSTOM section is MENU BACK-GROUND. There are three selections for this, GRAY, SHADED, and CLEAR. · CLEAR: Selection turns off any background for the Menu and video is clearly seen behind the Menu. · SHADED: Selection add a transparent background which makes the Menu easier to see and also some of the video behind the Menu. · GRAY: Selection generates a GRAY background for the MENU blocking video behind the Menu. This is accomplished by outputting any one of three different pulses from pin (40) of the Microprocessor. This signal is then routed through the PSZ1 connector pin (20) to the jungle IC IX01 pin (47) as YM signal which does the following: · CLEAR: No output during the display of the Menu. · SHADED: 1/2 Vcc pulse equal to the timing of the Menu background. · GRAY: Full Vcc equal to the timing of the Menu background.

OSD BLANKING PIN (51):

This pin is responsible for muting the video behind each character produced by the Microprocessor. This pulse is in exact time with the character, however it is slightly longer. In other words, just before any character is produced, this pin goes high and just after any character turns off, this pin turns off. This clears up the video behind the OSD character to make it easier to read. OSD Blk is produced from pin (51) of the Microprocessor. This signal is then routed through Q013, then through Q007, through the PSZ1 connector pin (19) to the jungle IC IX01 pin (36) as YS1 signal which mutes the video.

P Blk PICTURE BLANKING PIN (56):

This pin is responsible for muting the video when the Microprocessor deems it necessary. This would be during power up or power off, child lock, channel change, or selecting a video input with no video input available. P Blk is produced from pin (56) of the Microprocessor. This signal is then routed through Q007, through the PSZ1 connector pin (19) to the Jungle IC IX01 pin (36) as YS1 signal which mutes the video.

MODEL PARTS LIST

The following information is for models in and out of warranty. The ZP 94/95 models are module level repair.

To Order Parts: call 1-888-3-ZENITH

fax 1-888-6-ZENITH

By Mail: ZENITH NATIONAL PARTS
 SALES AND DISTRIBUTION CENTER
 P O Box 240007
 Huntsville, AL 35824-6407

MODEL PARTS

IQC50M94W

ZPN	LOC	DESC
809-10543		POWER / DEFLECTION PWB
809-10542		SIGNAL PWB ASSY
809-10548		VIDEO CHROMA PWB
809-10533		CRT / PRT PWB ASSY
809-10532		AUDIO / MATRIX PWB
809-10546		TERMINAL / JACKPACK PWB ASSY
809-10547		STANDBY POWER SUPPLY
809-10565		COMB FILTER, 3 LINE
811-10034		A/C LINE
814-10160		PANEL W/RF SWITCH
812-10529		FOCUS BLOCK / BLEEDER ASSY
849-10013		SPEAKER
965-10001		CASTER
857-10194	01	KEYBOARD PANEL/PLASTIC
809-10545	01A	REMOTE CONTROL PWB
NSP	02	LENS CRT METAL
992-10029	03	MIRROR
NSP	04	BARRIER BOARD
814-10150	05	REAR COVER, UPPER
NSP	06	FRONT COVER BOARD
NSP	07	BACK CENTER BAR
814-10152	08	BACK COVER, LOWER
857-10194	09	GRILLE
992-10031	10	MIRROR METAL A
992-10032	11	MIRROR METAL B
874-10023	12/13/14	SCREEN ASSY
900-10045	15	LIQUID COUPLER-RED
900-10046	16	LIQUID COUPLER-GREEN
900-10047	17	LIQUID COUPLER-BLUE
924-10092	900	REMOTE
971-10015	18/19/20	LENS & HOUSING ASSY (CPD78)
895-10116	21/22/23	YOKE RED, BLUE, GREEN

IQC60M94W

ZPN	LOC	DESC
809-10543		POWER / DEFLECTION PWB
809-10542		SIGNAL PWB ASSY
809-10548		VIDEO CHROMA PWB
809-10533		CRT / PRT PWB ASSY
809-10532		AUDIO / MATRIX PWB
809-10546		TERMINAL / JACKPACK PWB ASSY
809-10547		STANDBY POWER SUPPLY
809-10565		COMB FILTER, 3 LINE
811-10034		A/C LINE
814-10160		PANEL W/RF SWITCH
812-10529		FOCUS BLOCK / BLEEDER ASSY
849-10013		SPEAKER
965-10001		CASTER
857-10194	01	KEYBOARD PANEL/PLASTIC
809-10545	01A	REMOTE CONTROL PWB
NSP	02	LENS CRT METAL
992-10029	03	MIRROR
NSP	04	BARRIER BOARD
814-10149	05	REAR COVER, UPPER
NSP	06	FRONT COVER BOARD
NSP	07	BACK CENTER BAR
814-10151	08	BACK COVER, LOWER
857-10196	09	GRILLE
992-10031	10	MIRROR METAL A
992-10032	11	MIRROR METAL B
874-10023	12/13/14	SCREEN ASSY
900-10045	15	LIQUID COUPLER-RED
900-10046	16	LIQUID COUPLER-GREEN
900-10047	17	LIQUID COUPLER-BLUE
924-10092	900	REMOTE
971-10015	18/19/20	LENS & HOUSING ASSY (CPD78)
895-10116	21/22/23	YOKE RED, BLUE, GREEN

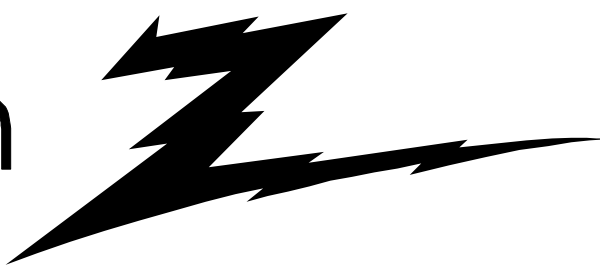
MODEL PARTS

IQC50H95W

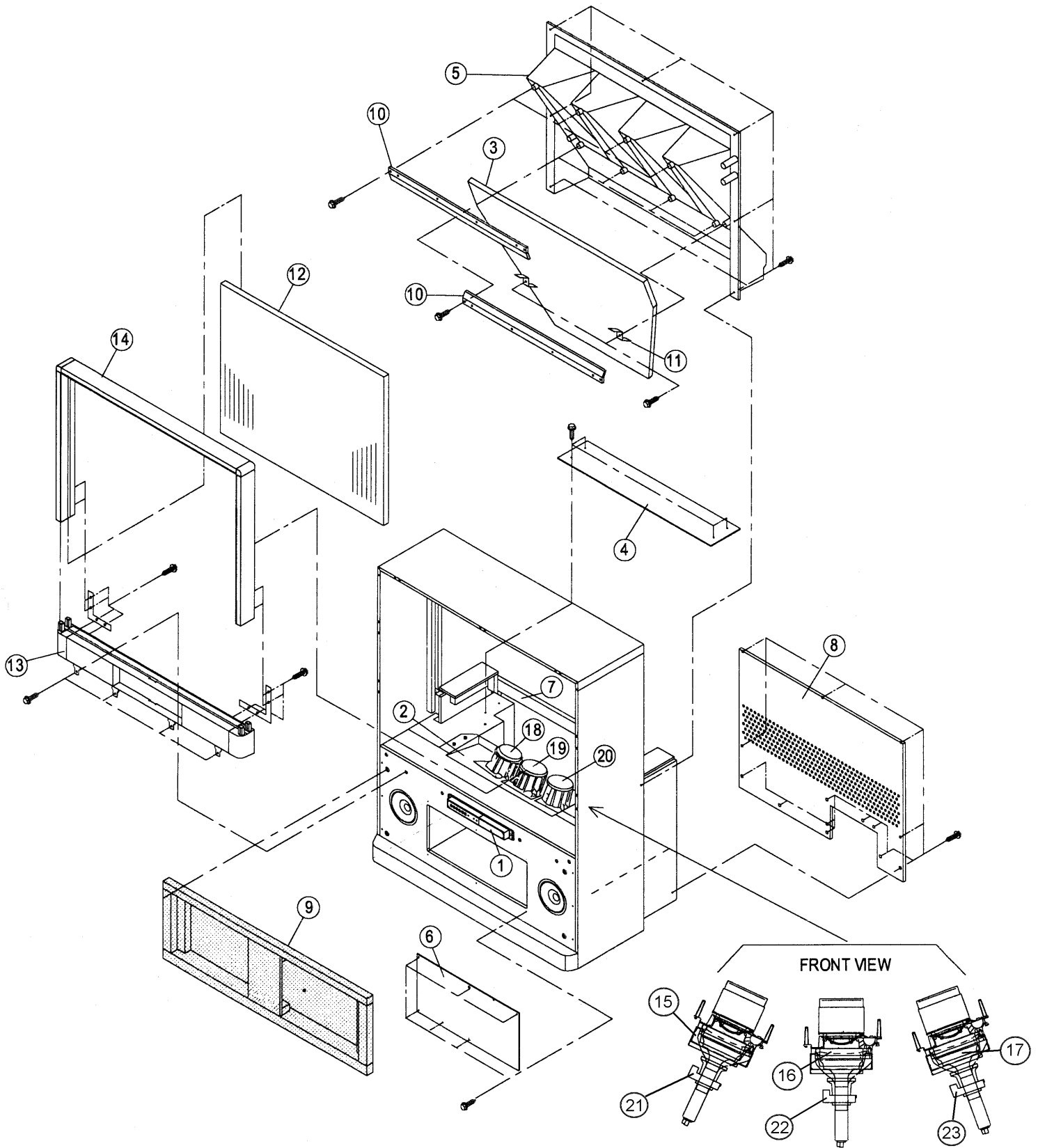
ZPN	LOC	DESC
809-10543		POWER / DEFLECTION PWB
809-10582		SIGNAL PWB ASSY
809-10548		VIDEO CHROMA PWB
809-10533		CRT / PRT PWB ASSY
809-10567		VELOCITY MODULATOR PWB
809-10532		AUDIO / MATRIX PWB
809-10546		TERMINAL / JACKPACK PWB ASSY
809-10547		STANDBY POWER SUPPLY
811-10034		A/C LINE
814-10160		PANEL W/RF SWITCH
812-10529		FOCUS BLOCK / BLEEDER ASSY
849-10013		SPEAKER
965-10001		CASTER
857-10194	01	KEYBOARD PANEL/PLASTIC
809-10545	01A	REMOTE CONTROL PWB
NSP	02	LENS CRT METAL
992-10030	03	MIRROR
NSP	04	BARRIER BOARD
814-10150	05	REAR COVER, UPPER
NSP	06	FRONT CONVERGENCE COVER
NSP	07	BACK CONTROL BAR
814-10152	08	BACK COVER, LOWER
857-10194	09	GRILLE
992-10031	10	MIRROR METAL A
992-10032	11	MIRROR METAL B
874-10006	12/13/14	SCREEN ASSY
900-10045	15	LIQUID COUPLER-RED
900-10046	16	LIQUID COUPLER-GREEN
900-10047	17	LIQUID COUPLER-BLUE
924-10092	900	REMOTE
971-10015	18/19/20	LENS & HOUSING ASSY (D78)
895-10116	21/22/23	YOKE RED, BLUE, GREEN

IQC60H95W

ZPN	LOC	DESC
809-10543		POWER / DEFLECTION PWB
809-10582		SIGNAL PWB ASSY
809-10548		VIDEO CHROMA PWB
809-10533		CRT / PRT PWB ASSY
809-10567		VELOCITY MODULATOR PWB
809-10532		AUDIO / MATRIX PWB
809-10546		TERMINAL / JACKPACK PWB ASSY
809-10547		STANDBY POWER SUPPLY
811-10034		A/C LINE
814-10160		PANEL W/RF SWITCH
812-10529		FOCUS BLOCK / BLEEDER ASSY
849-10013		SPEAKER
965-10001		CASTER
857-10194	01	KEYBOARD PANEL/PLASTIC
809-10545	01A	REMOTE CONTROL PWB
NSP	02	LENS CRT METAL
992-10030	03	MIRROR
NSP	04	BARRIER BOARD
814-10149	05	REAR COVER, UPPER
NSP	06	FRONT CONVERGENCE COVER
NSP	07	BACK CONTROL BAR
814-10151	08	BACK COVER, LOWER
857-10196	09	GRILLE
992-10031	10	MIRROR METAL A
992-10032	11	MIRROR METAL B
874-10006	12/13/14	SCREEN ASSY
900-10045	15	LIQUID COUPLER-RED
900-10046	16	LIQUID COUPLER-GREEN
900-10047	17	LIQUID COUPLER-BLUE
924-10092	900	REMOTE
971-10015	18/19/20	LENS & HOUSING ASSY (D78)
895-10116	21/22/23	YOKE RED, BLUE, GREEN

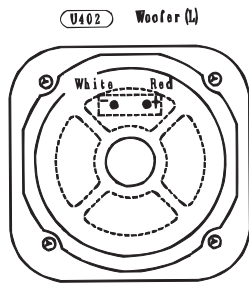
zenith 

EXPLODED VIEW

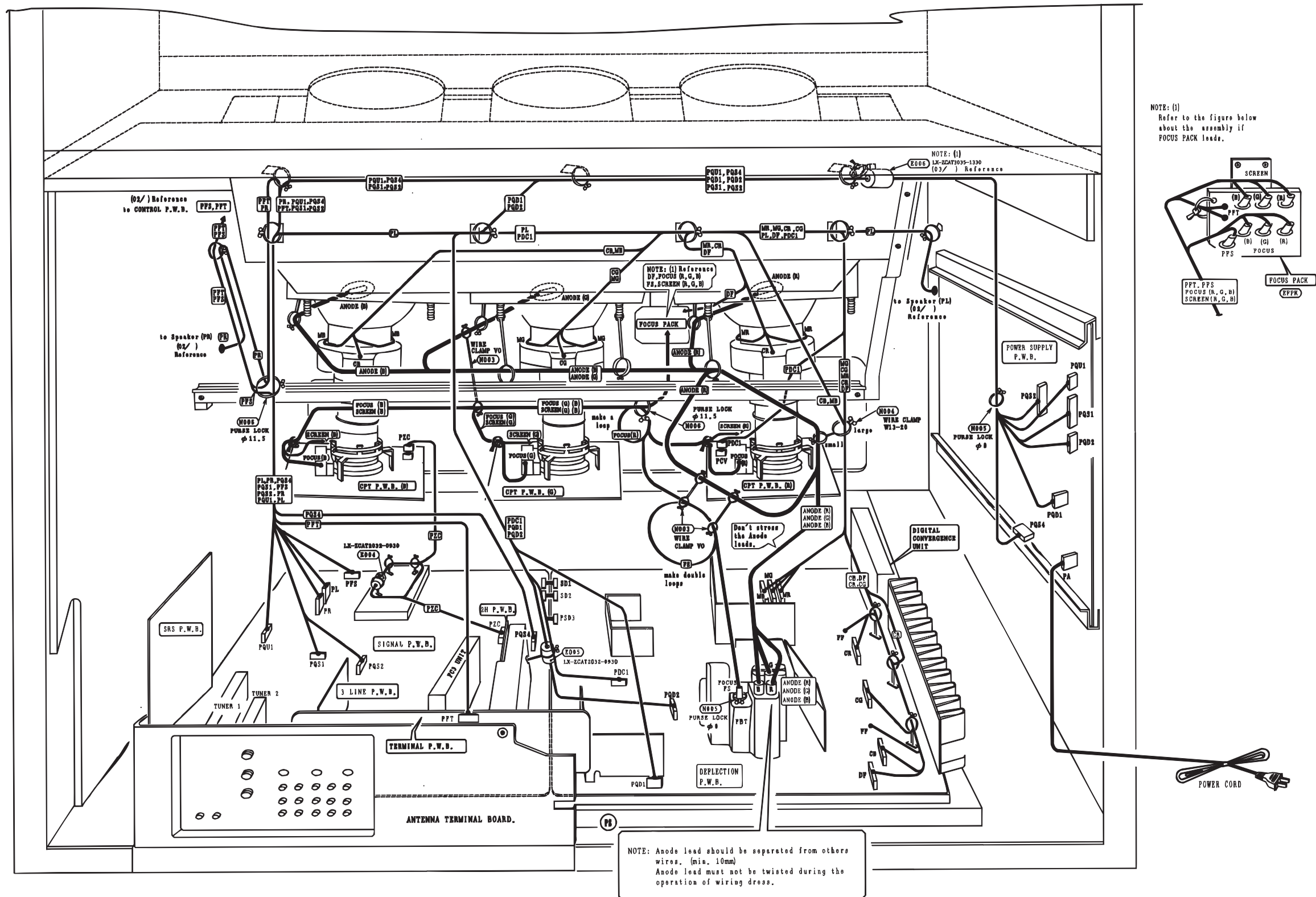


NOTE: Some parts may appear different than those shown in the Exploded View. When ordering, refer to the Replacement Parts List for correct part number. Since this Service Manual covers several models, use care to select the correct part for the model being serviced.

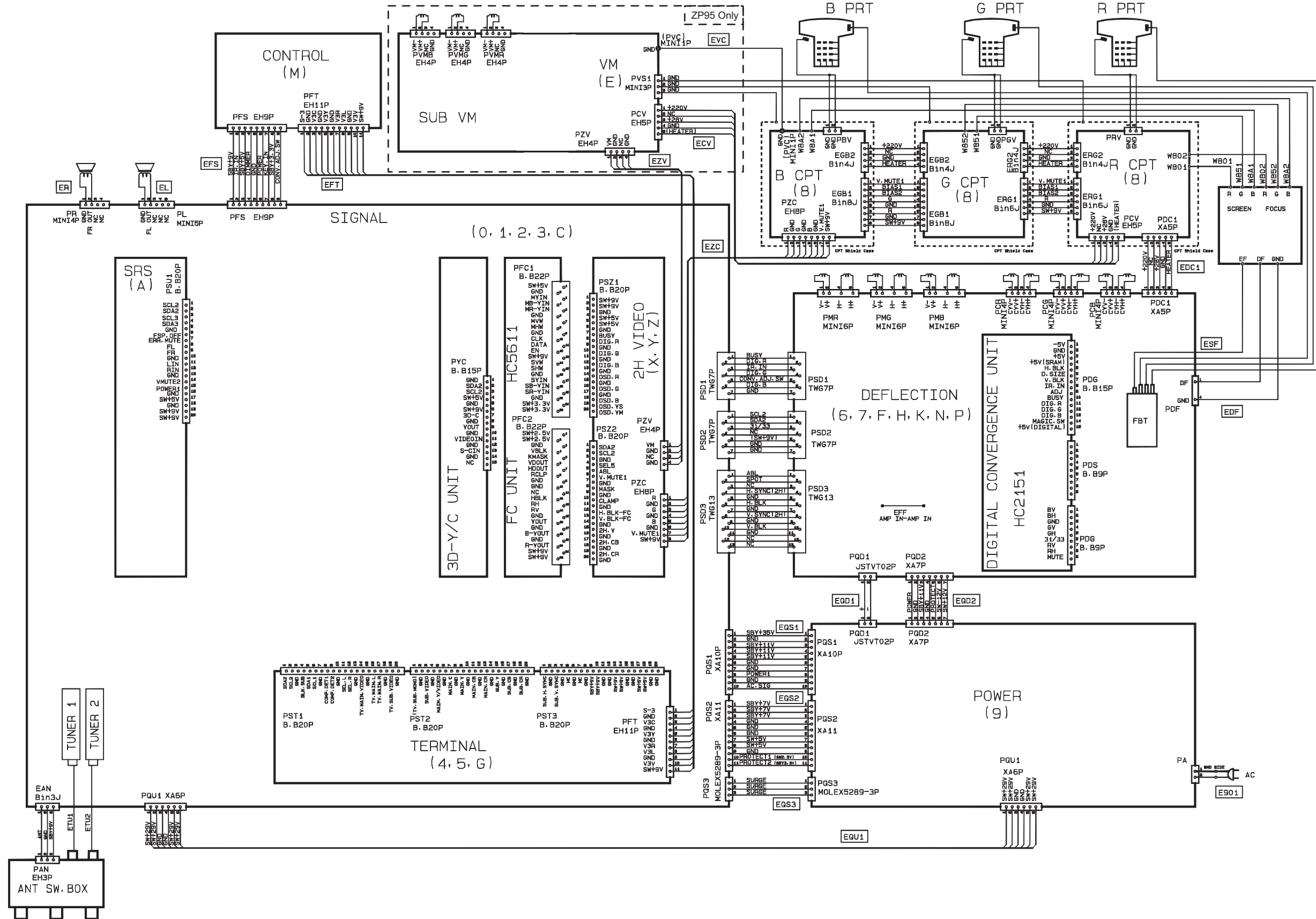
ZP94/95 Exploded View Front



ZP94/95 Exploded View Back



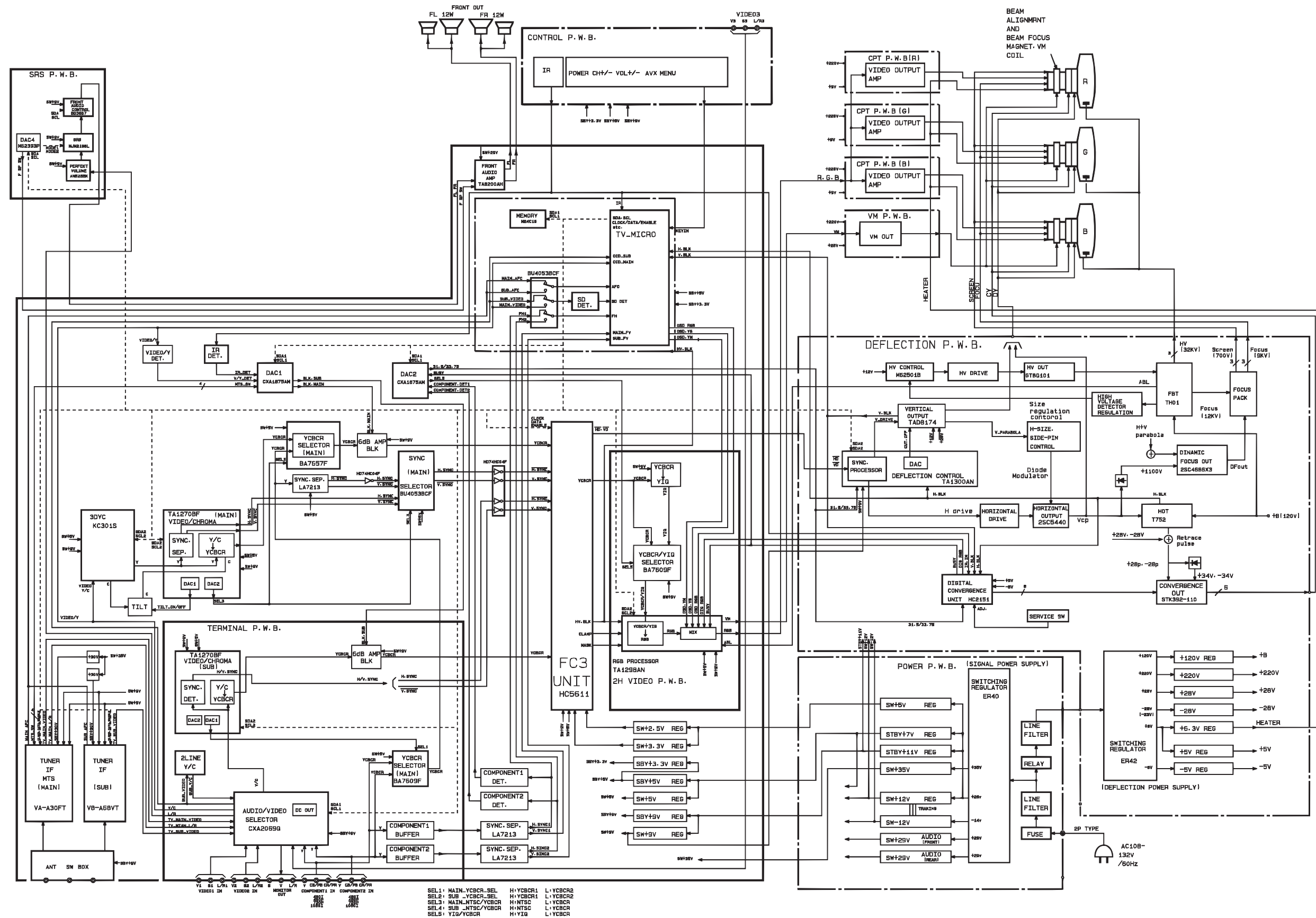
ZP94/95 Interconnect



CRITICAL SAFETY COMPONENTS ARE IDENTIFIED BY THE LETTER "X" IN THEIR COMPONENT DESIGNATORS. REPLACE ONLY WITH PART NUMBERS SPECIFIED.

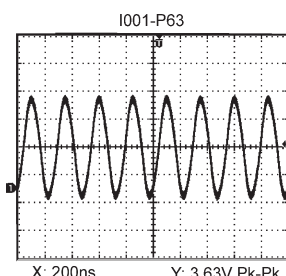
ALL SYMBOLS WITH "M" ON END OF DESIGNATOR
INDICATE SURFACE MOUNTED COMPONENT

ZP94/95 Wiring Diagram

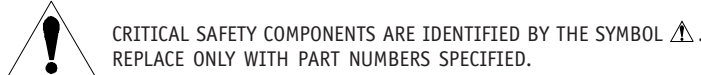


CRITICAL SAFETY COMPONENTS ARE IDENTIFIED BY THE LETTER "X" IN THEIR COMPONENT DESIGNATORS. REPLACE ONLY WITH PART NUMBERS SPECIFIED.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

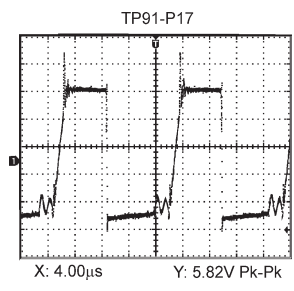
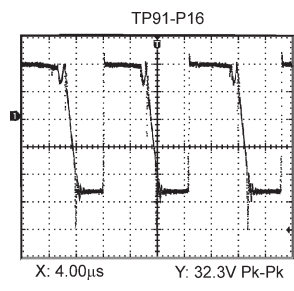
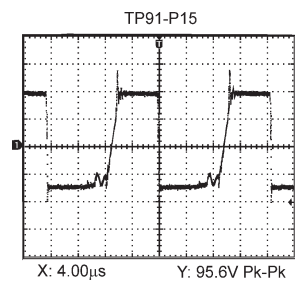
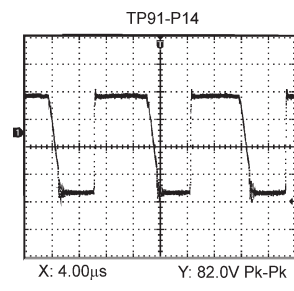
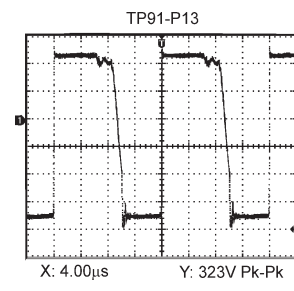
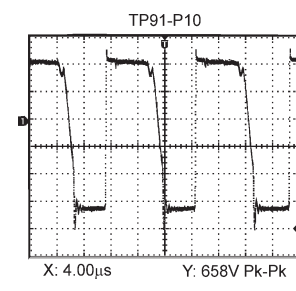
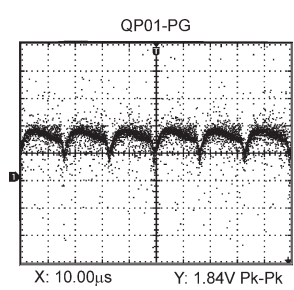
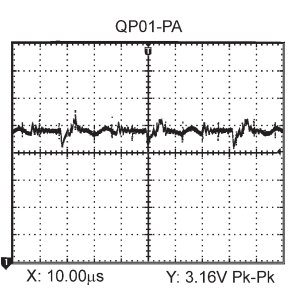
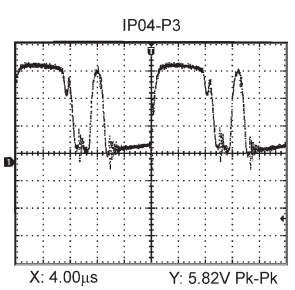
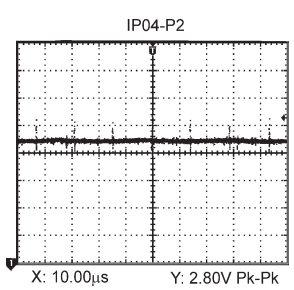
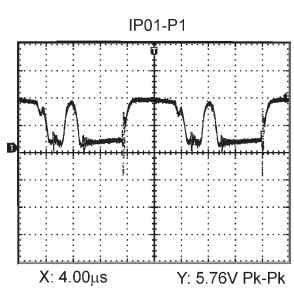
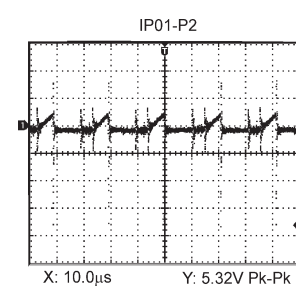
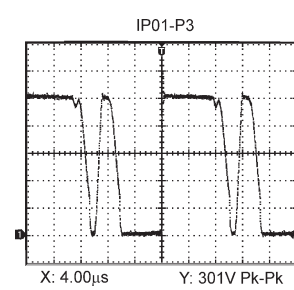
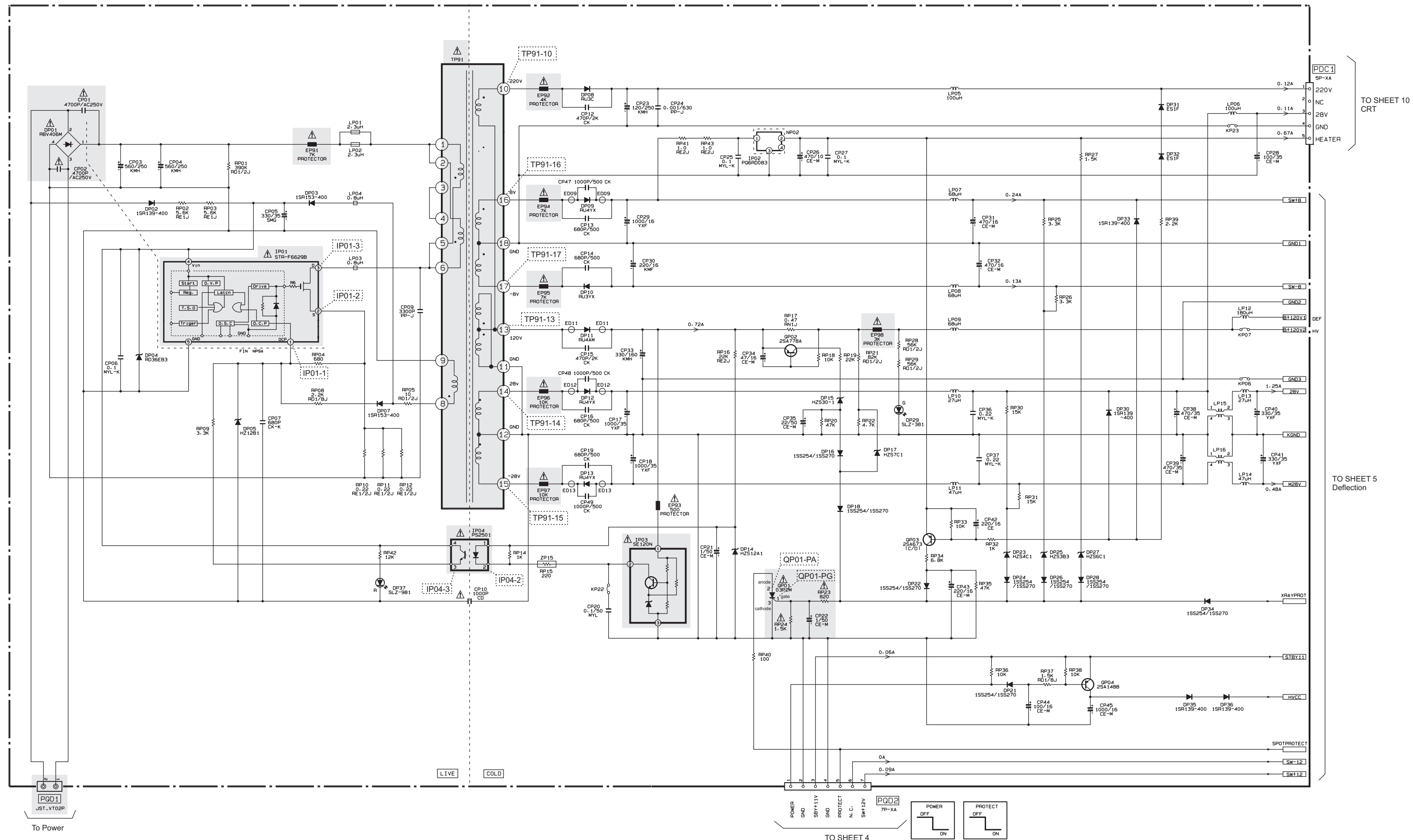


7-2

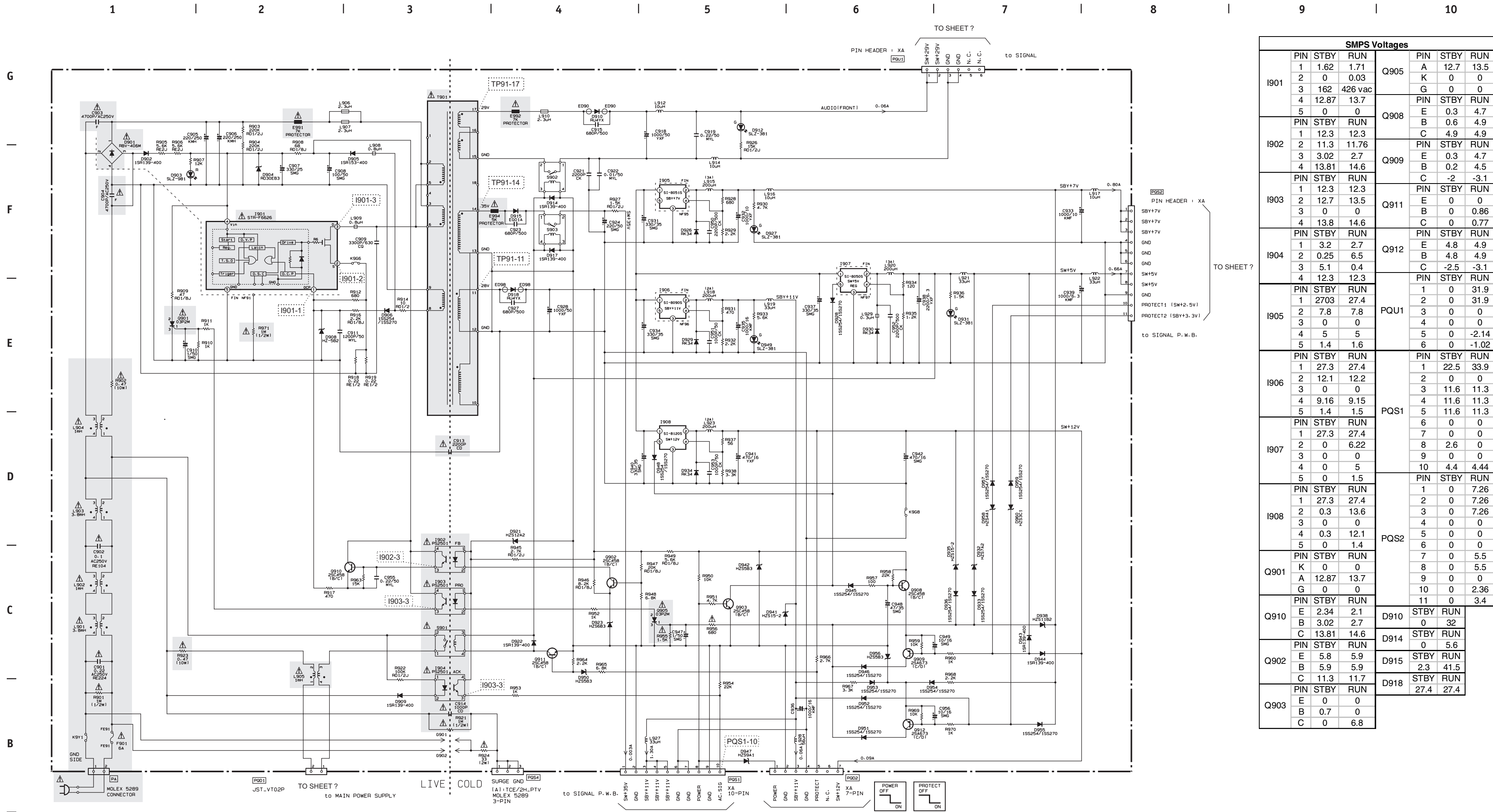


1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

G	Power Supply Voltages			
	QP01	PIN	RUN	
		A	10.3	
		K	0	
G		0.2		
—	QP04	PIN	RUN	
		E	11.3	
		B	10.6	
		C	11.2	
F	IP01	PIN	RUN	
		1	2	
		2	0	
		3	300.0vac	
		4	18.5	
—	IP02	5	0	
		PIN	RUN	
		1	7.8	
		2	6.3	
		3	0	
E	IP04	4	5.5	
		PIN	RUN	
		1	11.9	
		2	10.9	
		3	2	
—	IP03	4	18.5	
		PIN	RUN	
		1	120.2	
		2	10.6	
		3	0	
—	DP10	RUN	DP13	RUN
		-9.3		-28.5
	DP09	RUN	DP12	RUN
8.9		27.8		
D	DP08	RUN		
		227.0		
	PQD2	PIN	STBY	RUN
		1	10.4	8
		2	0	0
		3	0	11.34
		4	0	0
		5	0	10.35
		6	-2	1.03
		7	0	12.35



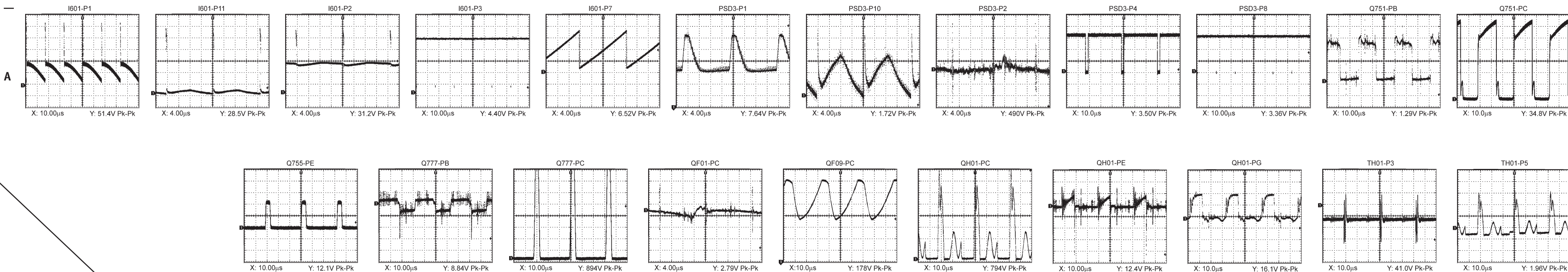
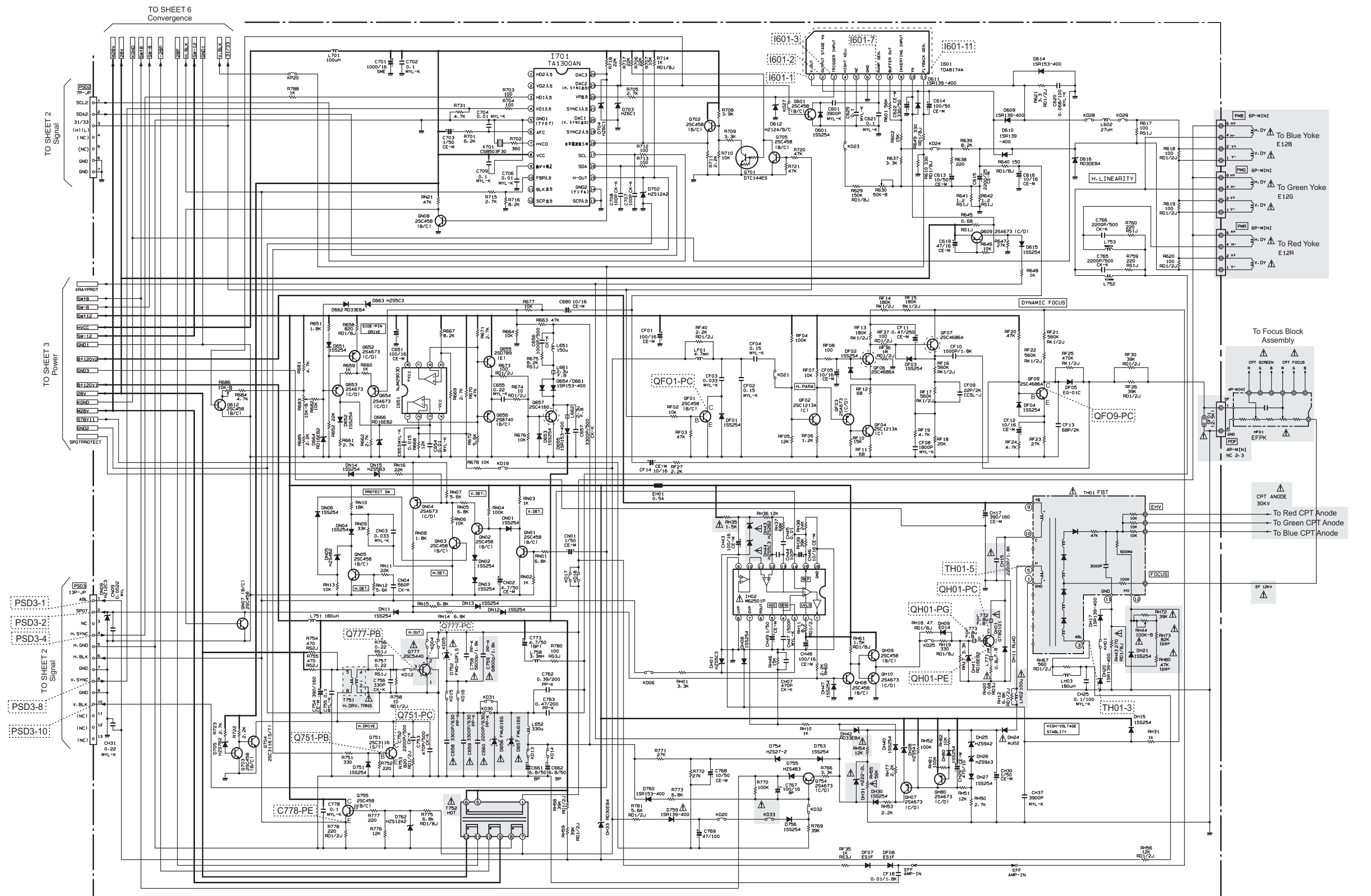
ZP94/95 Stand By Power Supply Circuit



SMPS Voltages									
I901	PIN	STBY	RUN	Q905	PIN	STBY	RUN		
	1	1.62	1.71		A	12.7	13.5		
	2	0	0.03		K	0	0		
	3	162	426 vac		G	0	0		
	4	12.87	13.7						
I902	PIN	STBY	RUN	Q908	PIN	STBY	RUN		
	1	12.3	12.3		E	0.3	4.7		
	2	11.3	11.76		B	0.6	4.9		
	3	3.02	2.7		C	4.9	4.9		
	4	13.81	14.6		PIN	STBY	RUN		
I903	PIN	STBY	RUN	Q909	E	0.3	4.7		
	1	12.3	12.3		B	0.2	4.5		
	2	12.7	13.5		C	-2	-3.1		
	3	0	0		PIN	STBY	RUN		
	4	13.8	14.6		E	0	0		
I904	PIN	STBY	RUN	Q911	B	0	0.86		
	1	3.2	2.7		C	0	0.77		
	2	0.25	6.5		PIN	STBY	RUN		
	3	5.1	0.4		E	4.8	4.9		
	4	12.3	12.3		B	4.8	4.9		
I905	PIN	STBY	RUN	Q912	C	-2.5	-3.1		
	1	2703	27.4		PIN	STBY	RUN		
	2	7.8	7.8		1	0	31.9		
	3	0	0		2	0	31.9		
	4	5	5		3	0	0		
I906	PIN	STBY	RUN	PQU1	4	0	0		
	1	27.3	27.4		5	0	-2.14		
	2	12.1	12.2		6	0	-1.02		
	3	0	0						
	4	9.16	9.15						
I907	PIN	STBY	RUN	PQS1	PIN	STBY	RUN		
	1	27.3	27.4		1	22.5	33.9		
	2	0	6.22		2	0	0		
	3	0	0		3	11.6	11.3		
	4	0	5		4	11.6	11.3		
I908	PIN	STBY	RUN	PQS2	5	11.6	11.3		
	1	27.3	27.4		6	0	0		
	2	0.3	13.6		7	0	0		
	3	0	0		8	2.6	0		
	4	0.3	12.1		9	0	0		
Q901	PIN	STBY	RUN	PQS2	10	4.4	4.44		
	K	0	0		PIN	STBY	RUN		
	A	12.87	13.7		1	0	7.26		
	G	0	0		2	0	7.26		
					3	0	7.26		
Q910	PIN	STBY	RUN	D910	4	0	0		
	E	2.34	2.1		5	0	0		
	B	3.02	2.7		6	0	0		
	C	13.81	14.6		7	0	5.5		
					8	0	5.5		
Q902	PIN	STBY	RUN	D914	9	0	0		
	E	5.8	5.9		10	0	2.36		
	B	5.9	5.9		11	0	3.4		
	C	11.3	11.7						
Q903	PIN	STBY	RUN	D918	STBY	RUN			
	E	0	0		0	5.6			
	B	0.7	0		STBY	RUN			
	C	0	6.8		2.3	41.5			
					STBY	RUN			

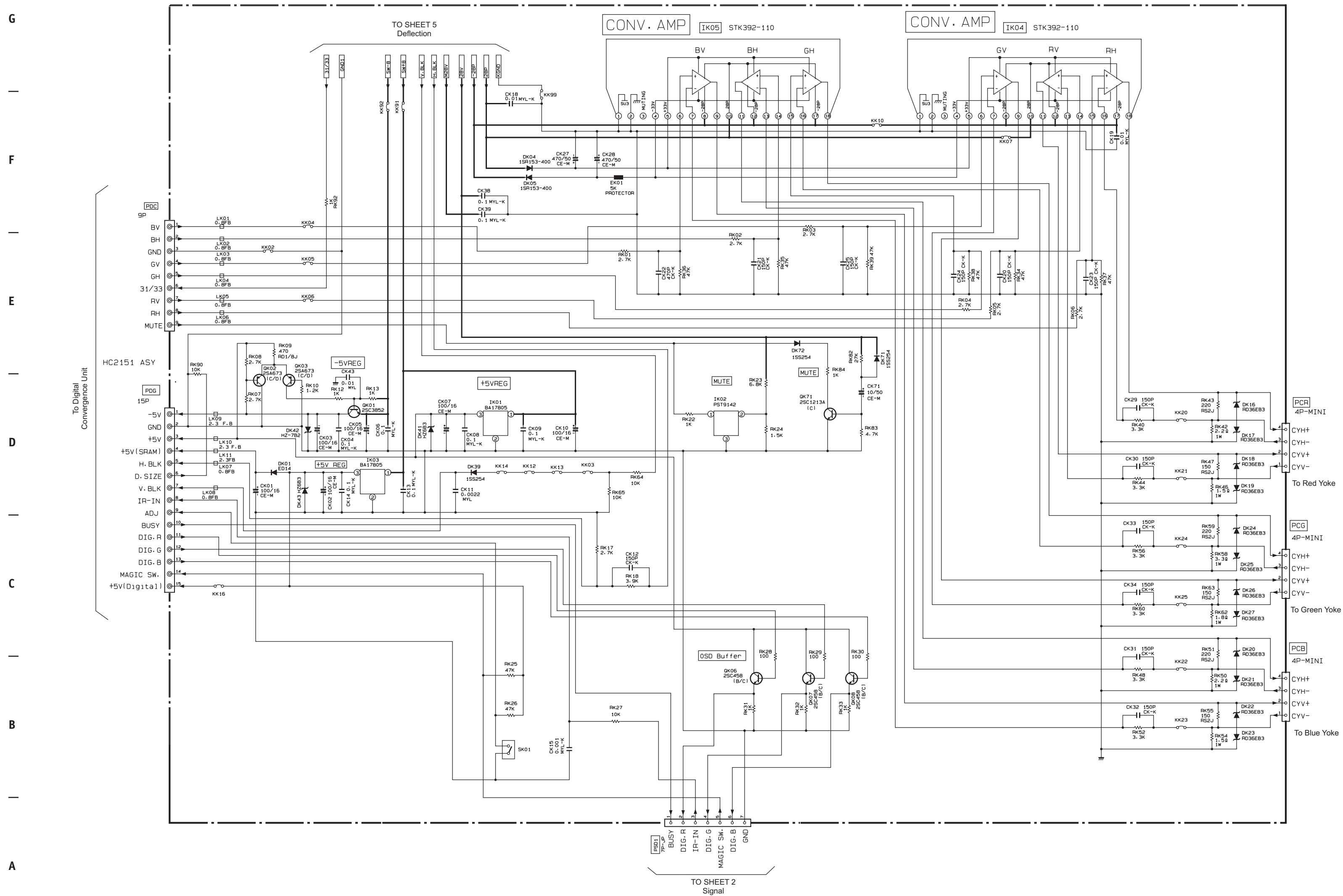
1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

F	QF02	PIN	RUN	Q702	PIN	RUN	I601	PIN	RUN	I651	PIN	RUN				
		B	1.3		B	7		1	15.6		1	0.7				
		C	6.7		C	9.7		2	27.1		2	1.3				
	QF03	PIN	RUN	Q703	PIN	RUN		3	4.9		3	0.9				
		B	6.7		B	16.8		4	6.7		4	0				
		C	0.8		C	0		5	4.6		5	3.1				
	QF04	PIN	RUN	Q704	PIN	RUN		6	0		6	0.7				
		B	0.8		B	0.6		7	3.8		7	1.8				
		C	11.7		C	0		8	4.6		8	12.3				
	E	QF06	PIN	RUN	Q705	PIN		RUN	QN01		PIN	RUN	IH02	PIN	RUN	
			B	12.3		B		0.7			B	0		1	6.4	
			C	395		C		0.1			C	12.1		2	12.4	
QF07		PIN	RUN	Q751	PIN	RUN	E	0		3	0.9					
		B	383		B	0.4	B	11.2		4	2.5					
		C	981.6		C	16.3	C	-3		5	1.6					
QF09		PIN	RUN	Q754	PIN	RUN	E	0		6	0					
		B	11.6		B	9.2	E	11.2		7	0					
		C	482.2		C	0.8	C	-3		8	0					
D		QF05	PIN	RUN	Q755	PIN	RUN	QN03		PIN	RUN	PSD3		PIN	RUN	
			B	11.5		B	1.1			B	0			9	7.2	
			C	0		C	12.3			C	-2.7			10	7.2	
	QF01	PIN	RUN	Q777	PIN	RUN	QN04		E	0	11		7.2			
		B	0.7		B	0			B	0	12		7.2			
		C	0		C	116.9			C	-0.7	13		2.7			
	C	Q612	PIN	RUN	QH07	PIN			RUN	QN05	E		0	14	1.9	
			B	0.3		B			12		E		11.4	15	4.9	
			C	8.7		C			-0.2		PIN		RUN	16	0	
		Q652	PIN	RUN	QH08	PIN			RUN		QN07		B	1	PIN	RUN
			B	10.9		B			0.6				C	0	1	11.3
			C	7		C			4				C	0	2	-1
B		Q653	PIN	RUN	QH09	PIN		RUN	QN08			E	0	3	-9	
			B	6.4		B		4				E	0	4	3.6	
			C	1		C		12.3				E	0	5	0	
		Q654	PIN	RUN	QH10	PIN	RUN	I701				C	-0.1	6	1.5	
			B	5.6		B	4					B	0	7	0	
			C	2.5		C	0					B	0.6	8	3.2	
	A	Q655	PIN	RUN	QH80	PIN	RUN			I701		E	0	9	0	
			B	0.6		B	12.2					PIN	RUN	10	.6	
			C	12.3		C	12					B	0.6	11	0	
		Q656	PIN	RUN	QH01	PIN	RUN				I701	C	0	12	0	
			B	0.7		B	3.3					E	0	13	6.6vac	
			C	0		C	119.5					E	0	14	0	
Q657		PIN	RUN	Q601	PIN	RUN	I701		E			0	PIN	RUN		
		B	0		B	0.3			5			0	1	4.8		
		C	100		C	2.5			6			7	2	4.8		
Q701		PIN	RUN	Q609	PIN	RUN		I701	7			5.7	3	4.1		
		B	0.1		B	27.4			8			9.7	4	4		
		C	7		C	0			9			2.7	5	9.3		
A	Q701	PIN	RUN	Q609	PIN	RUN			I701	10		1.2	6	0		
		B	0.1		B	27.4				11		1.2	7	0		
		C	7		C	0				12		1.2	8	0		
	Q701	PIN	RUN	Q609	PIN	RUN				I701	13	0	D656	RUN		
		B	0.1		B	27.4					14	0	27.8			
		C	7		C	0					15	1.3	D657	RUN		
	Q701	PIN	RUN	Q609	PIN	RUN	I701				16	4.9		27.8		
		B	0		B	0.3					17	4.9				
		C	100		C	2.5					18	6.3				
	Q701	PIN	RUN	Q609	PIN	RUN		I701			19	2.2		27.8		
		B	0.1		B	27.4					20	0.1				
		C	7		C	0					21	2.2				
Q701	PIN	RUN	Q609	PIN	RUN	I701			22		5.2		27.8			
	B	0.1		B	27.4				23		0.3					
	C	7		C	0				24		0.8					



 CRITICAL SAFETY COMPONENTS ARE IDENTIFIED BY THE SYMBOL . REPLACE ONLY WITH PART NUMBERS SPECIFIED.

ZP94/95 Convergence Power Supply

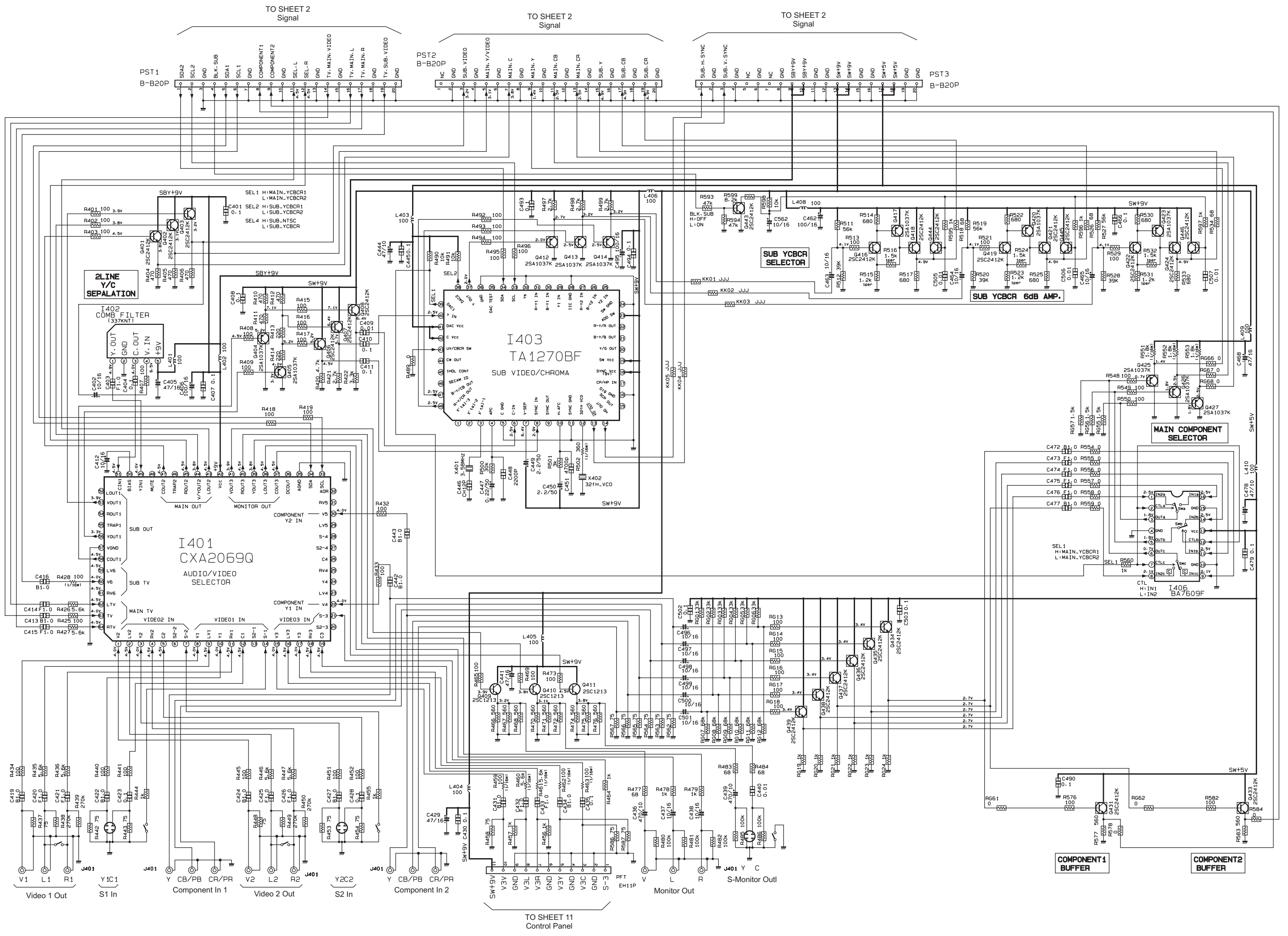


Convergence Voltages					
IK01	PIN	RUN	PDC	PIN	RUN
	1	8.8		1	0
	2	0		2	.1
	3	5		3	0
IK02	PIN	RUN	PDC	PIN	RUN
	1	3.6		4	0
	2	5		5	.5
	3	0		6	4.2
IK03	PIN	RUN	PDC	PIN	RUN
	1	8.8		8	.3
	2	0		9	3.6
	3	5		1	0
QK01	PIN	RUN	PDC	PIN	RUN
	E	-9.3		2	0
	B	-8.7		3	-31.3
	C	-5.3		4	-32.3
QK02	PIN	RUN	PDC	PIN	RUN
	E	0.6		5	33
	B	0		6	0
	C	0		7	0
QK03	PIN	RUN	PDC	PIN	RUN
	E	0.6		8	28.2
	B	0		9	1.0
	C	-8.0		10	27.1
QK04	PIN	RUN	PDC	PIN	RUN
	E	0.6		11	0
	B	0		12	-28.3
	C	-8.0		13	0
QK07	PIN	RUN	PDC	PIN	RUN
	E	0		14	0
	B	0		15	.2
	C	9.0		16	.3
QK08	PIN	RUN	PDC	PIN	RUN
	E	0		17	-28.3
	B	0		18	.3
	C	5.0			
PDG	PIN	RUN	PDC	PIN	RUN
	1	8.8		1	0
	2	0		2	0
	3	5		3	-31.3
	4	0		4	-32.3
	5	3.6		5	33
	6	4.2		6	0
	7	0		7	0
	8	.3		8	28.2
	9	3.6		9	1.0
	10	27.1		10	27.1
	11	0		11	0
	12	-28.3		12	-28.3
	13	0		13	0
	14	0		14	0
	15	.2		15	.2

ZP94/95 Backpack Terminal Circuit

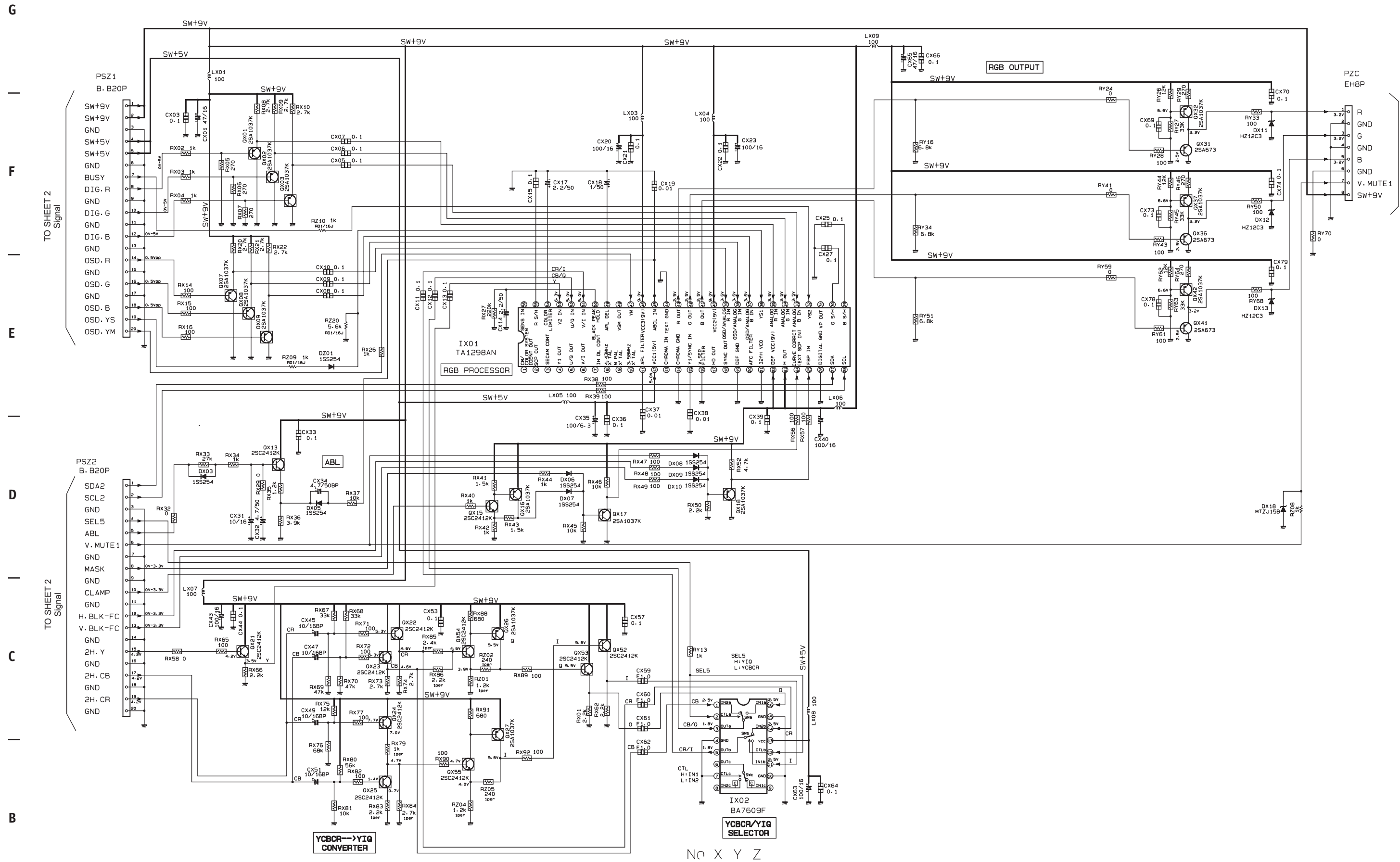
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

Jackpack Voltages									
PIN	RUN	PIN	RUN	PIN	RUN	PIN	RUN	PIN	RUN
1	4	1	2.6	Q401	B 4.5	Q423	B 8.5		
2	4.5	2	4.9		C 9		C 5.5		
3	4	3	1.8		E 3.9		E 9.1		
4	4.5	4	0		PIN RUN		PIN RUN		
5	4.5	5	1.8	Q402	B 4.5	Q424	B 5.5		
6	0.2	6	0.7		C 9		C 9.1		
7	4.9	7	4.9		E 3.8		E 4.8		
8	4	8	2.1		PIN RUN		PIN RUN		
9	4.5	9	2.1	Q403	B 4.6	Q425	B 0.7		
10	4	10	0		C 9		C 0		
11	4.5	11	2.5		E 3.9		E 1.4		
12	4.5	12	4.9		PIN RUN		PIN RUN		
13	0.2	13	5	Q406	B 5.9	Q426	B 1.8		
14	4.9	14	2.6		C 9.1		C 2.4		
15	4	15	0		E 5.3		E 0		
16	4.5	16	2.5		PIN RUN		PIN RUN		
17	4	17	4	Q409	B 4.6	Q427	B 1.8		
18	4.5	18	4		C 9		C 2.5		
19	4.5	19	4		E 3.9		E 0		
20	0.2	20	3		PIN RUN		PIN RUN		
21	5	21	4	Q410	B 3.7	Q431	B 2.5		
22	4	22	5		C 9		C 5		
23	4.5	23	4.5		E 3.1		E 1.9		
24	4.1	24	7	Q411	B 6.3	Q433	B 2.5		
25	4.5	25	8		C 9.1		C 5		
26	4.5	26	9		E 3.9		E 1.9		
27	0.2	27	10	Q412	B 0	Q434	B 3.2		
28	5	28	11		C 0		C 5		
29	4.5	29	12		E 0.7		E 2.5		
30	4	30	13	Q413	B 2.4	Q435	B 3.1		
31	4.5	31	14		C 3		C 5		
32	0.1	32	15		E 0		E 2.5		
33	5	33	16	Q414	B 2.5	Q436	B 3.1		
34	5	34	17		C 3		C 5		
35	0	35	18		E 0		E 2.5		
36	4.5	36	19	Q416	B 3.7	Q437	B 3.1		
37	4.5	37	20		C 3.1		C 5		
38	4.6	38	21	Q417	B 8.5	Q438	B 3.1		
39	3.7	39	22		C 5.5		C 5		
40	4.6	40	23	Q418	E 9.1	Q439	E 2.5		
41	5	41	24		E 4.8		E 2.5		
42	9	42	25	Q419	B 3.7	Q443	B 0.7		
43	4.6	43	26		C 8.5		C 0.1		
44	0	44	27	Q420	E 3.1	Q444	E 0		
45	3.9	45	28		E 3.1		E 0		
46	3.7	46	29	Q421	B 5.5	Q445	B 4.2		
47	4.5	47	30		C 8.5		C 9.1		
48	0.1	48	31	Q422	E 4.9	Q446	E 4.8		
49	5	49	32		E 9.1		E 4.8		
50	4.6	50	33		E 0		E 4.8		
51	4.5	51	34		E 4.8		E 4.8		
52	4.6	52	35		E 4.8		E 4.8		
53	4.6	53	36		E 4.8		E 4.8		
54	4.6	54	37		E 4.8		E 4.8		
55	3.7	55	38		E 4.8		E 4.8		
56	4.3	56	39		E 4.8		E 4.8		
57	0	57	40		E 4.8		E 4.8		
58	4.5	58	41		E 4.8		E 4.8		
59	4.5	59	42		E 4.8		E 4.8		
60	4.4	60	43		E 4.8		E 4.8		
61	4.5	61	44		E 4.8		E 4.8		
62	4.5	62	45		E 4.8		E 4.8		
63	4.4	63	46		E 4.8		E 4.8		
64	4.5	64	47		E 4.8		E 4.8		
PIN RUN		PIN RUN							
1	6.5	1	6.5						
2	0	2	0						
3	4.1	3	4.1						
4	5.1	4	5.1						
5	9.1	5	9.1						



CRITICAL SAFETY COMPONENTS ARE IDENTIFIED BY THE SYMBOL .
REPLACE ONLY WITH PART NUMBERS SPECIFIED.

ZP94/95 3 Line Comb Filter



Comb Filter Voltages											
QX01	PIN	RUN	QX25	PIN	RUN	QX26	PIN	RUN	QX27	PIN	RUN
QX01	B	0	QX25	B	0	QX26	B	0	QX27	B	8.5
	C	0.1		C	4.9		C	4.6		C	0
	E	0.7		E	0.9		E	9.1		E	9.2
QX02	PIN	RUN	QX26	PIN	RUN	QX27	PIN	RUN	QX31	PIN	RUN
QX03	B	0	QX27	B	8.5	QX31	B	2.6	QX32	B	6.9
	C	0		C	0		C	0.1		C	3.2
	E	0.7		E	9.2		E	7.6		E	7.6
QX07	B	0	QX31	B	2.6	QX32	B	6.9	QX36	B	2.7
	C	0		C	0.1		C	3.2		C	0
	E	0.2		E	3.2		E	7.6		E	3.3
QX08	B	0	QX32	B	6.9	QX36	B	2.7	QX37	B	6.9
	C	0		C	3.2		C	0		C	3.3
	E	0.7		E	7.6		E	7.6		E	7.6
QX09	B	0.1	QX36	B	2.7	QX37	B	6.9	QX41	B	2.8
	C	0.1		C	0		C	3.3		C	0.1
	E	0.2		E	3.3		E	7.6		E	3.4
QX13	B	7.3	QX37	B	6.9	QX41	B	2.8	QX42	B	1.3
	C	9.2		C	3.3		C	0.1		C	0.6
	E	6.6		E	7.6		E	3.4		E	1.3
QX15	B	0.2	QX41	B	2.8	QX42	B	1.3	QX46	B	3.5
	C	9.1		C	0.1		C	0.6		C	9.2
	E	0.2		E	3.4		E	1.3		E	2.8
QX16	B	9.1	QX42	B	1.3	QX46	B	3.5	QX52	B	4.9
	C	0.3		C	0.6		C	9.2		C	0.1
	E	9.1		E	1.3		E	2.8		E	4.3
QX17	B	1.2	QX46	B	3.5	QX52	B	4.9	QX53	B	4.6
	C	0		C	9.2		C	0.1		C	9.1
	E	1.7		E	2.8		E	4.3		E	3.9
QX18	B	0.6	QX52	B	4.9	QX53	B	4.6	QX54	B	4.6
	C	0		C	0.1		C	9.1		C	8.5
	E	1.3		E	4.3		E	4		E	4.3
QX21	B	0.8	QX53	B	4.6	QX54	B	4.6	QX55	B	4.9
	C	1.6		C	9.1		C	8.5		C	8.5
	E	0.7		E	3.9		E	4.3		E	4.3
QX22	B	5.3	QX54	B	4.6	QX55	B	4.9	QX55	B	4.9
	C	9.1		C	8.5		C	8.5		C	8.5
	E	4.6		E	4		E	4.3		E	4.3
QX23	B	5.3	QX55	B	4.9	QX55	B	4.9	QX55	B	4.9
	C	9.1		C	8.5		C	8.5		C	8.5
	E	4.6		E	4.3		E	4.3		E	4.3
QX24	B	7.7	QX55	B	4.9	QX55	B	4.9	QX55	B	4.9
	C	9.1		C	8.5		C	8.5		C	8.5
	E	7.1		E	4.3		E	4.3		E	4.3

ZP94/95 YC Circuit

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

G

—

F

—

E

—

D

—

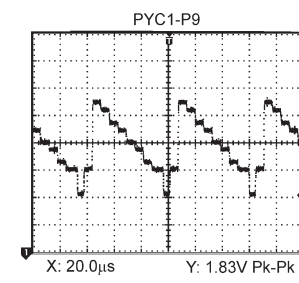
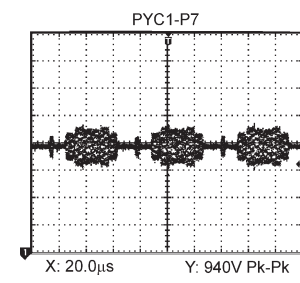
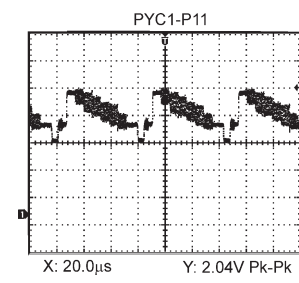
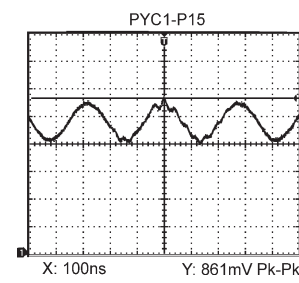
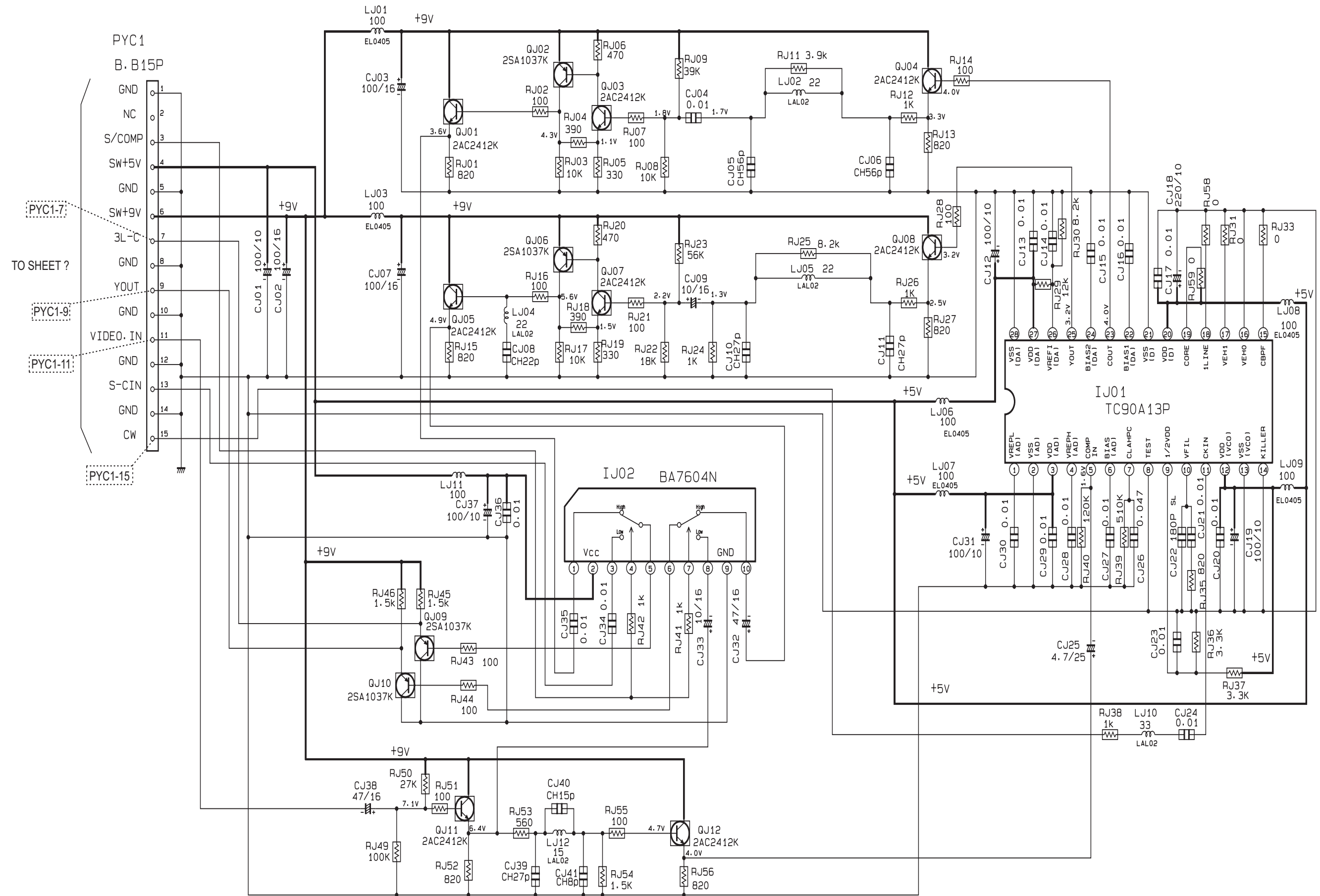
C

—

B

—

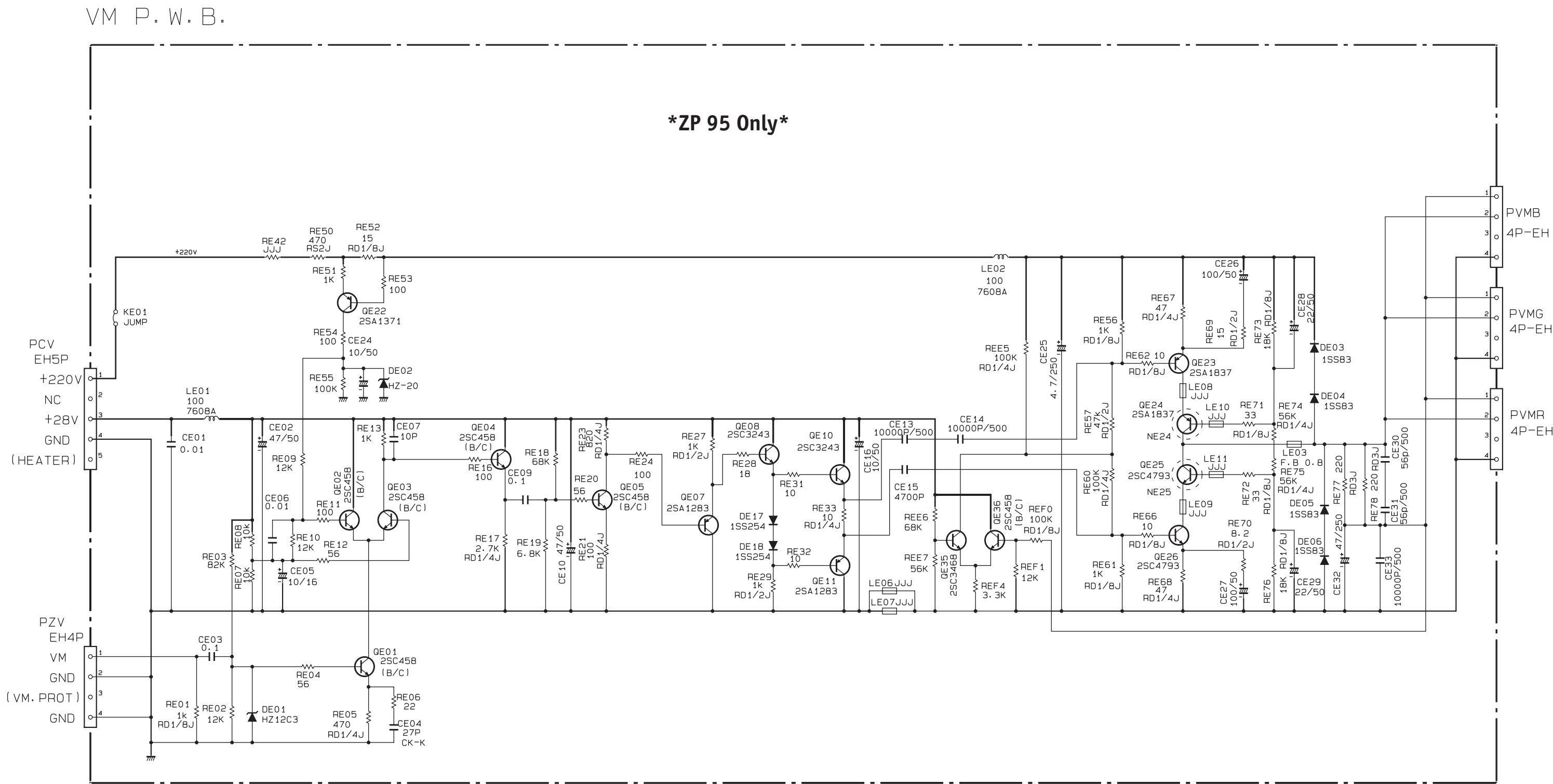
A



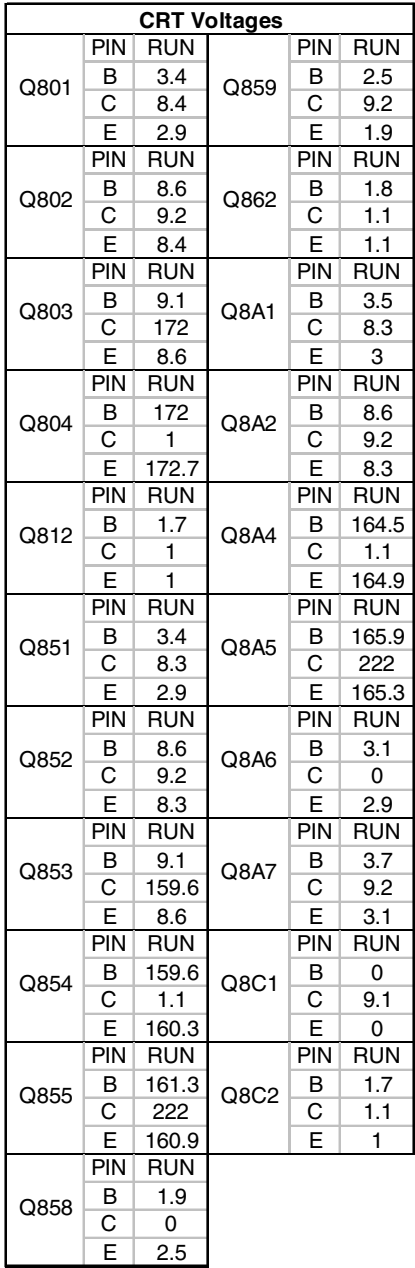
CRITICAL SAFETY COMPONENTS ARE IDENTIFIED BY THE SYMBOL .
REPLACE ONLY WITH PART NUMBERS SPECIFIED.

ZP95 Velocity Modulator

Velocity Modulator Voltages		
G	QE01	PIN RUN
		B 3.4
		C 12.7
		E 2.7
F	QE02	PIN RUN
		B 12
		C 27.9
		E 12.7
E	QE03	PIN RUN
		B 13.4
		C 22.3
		E 12.7
D	QE04	PIN RUN
		B 22.3
		C 27.9
		E 21.6
C	QE05	PIN RUN
		B 2.3
		C 15.4
		E 1.6
B	QE07	PIN RUN
		B 15.6
		C 0
		E 16.2
A	QE08	PIN RUN
		B 16.1
		C 27.9
		E 15.5
	QE10	PIN RUN
		B 15.5
		C 27.9
		E 14.9
	QE11	PIN RUN
		B 14
		C 0
		E 14.6
	QE22	PIN RUN
		B 211.6
		C 10.7
		E 212.1
	QE23	PIN RUN
		B 210.2
		C 187.7
		E 210.7
	QE24	PIN RUN
		B 187
		C 0
		E 187.8
	QE25	PIN RUN
		B 25.1
		C 117
		E 24.6
	QE26	PIN RUN
		B 1.4
		C 24.6
		E 0.9
	QE35	PIN RUN
		B 12.4
		C 139.5
		E 11.9
	QE36	PIN RUN
		B 12.5
		C 27.9
		E 11.9



1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----



ZP94/95 Control Panel Circuit

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10

G

F

E

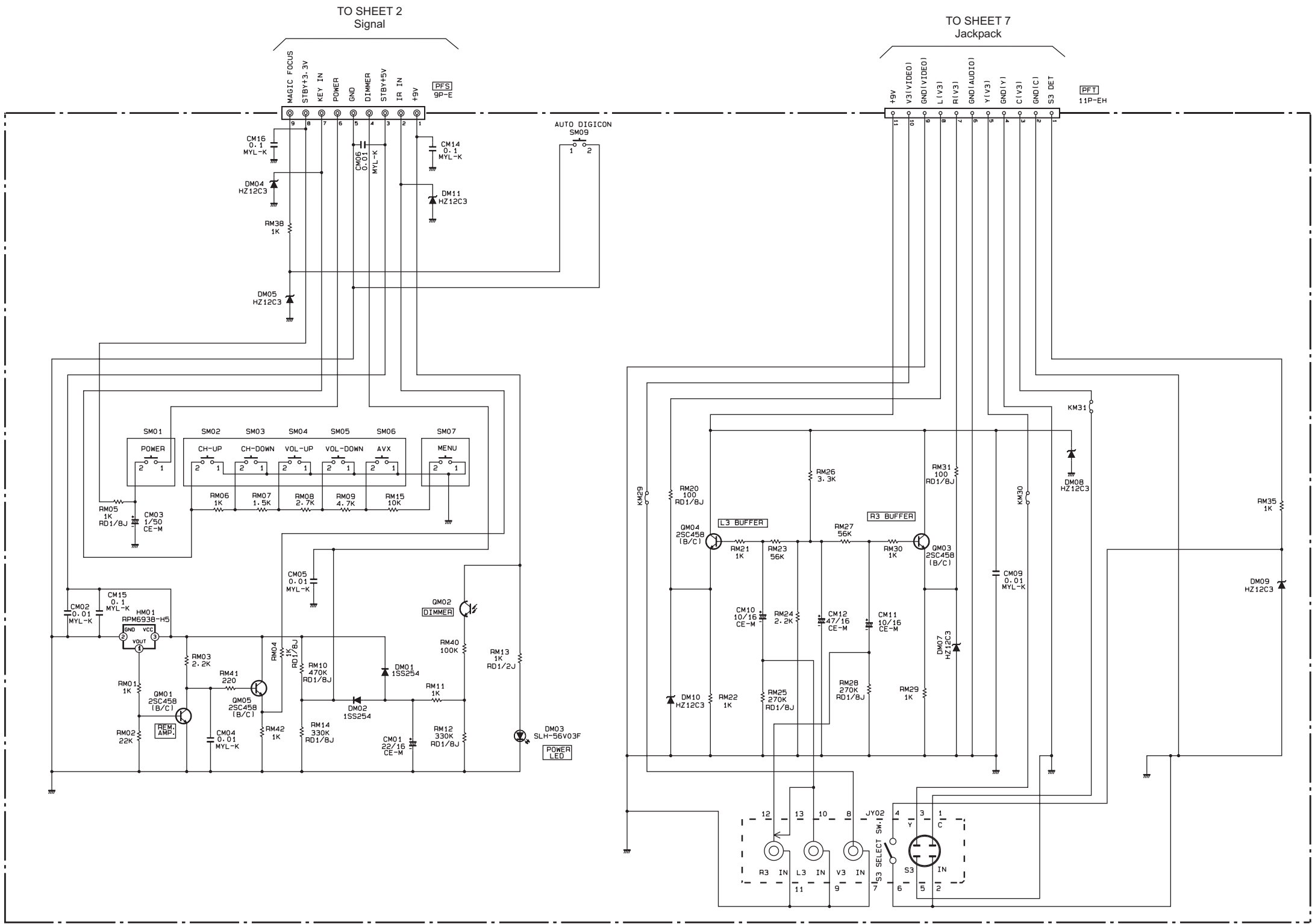
D

C

B

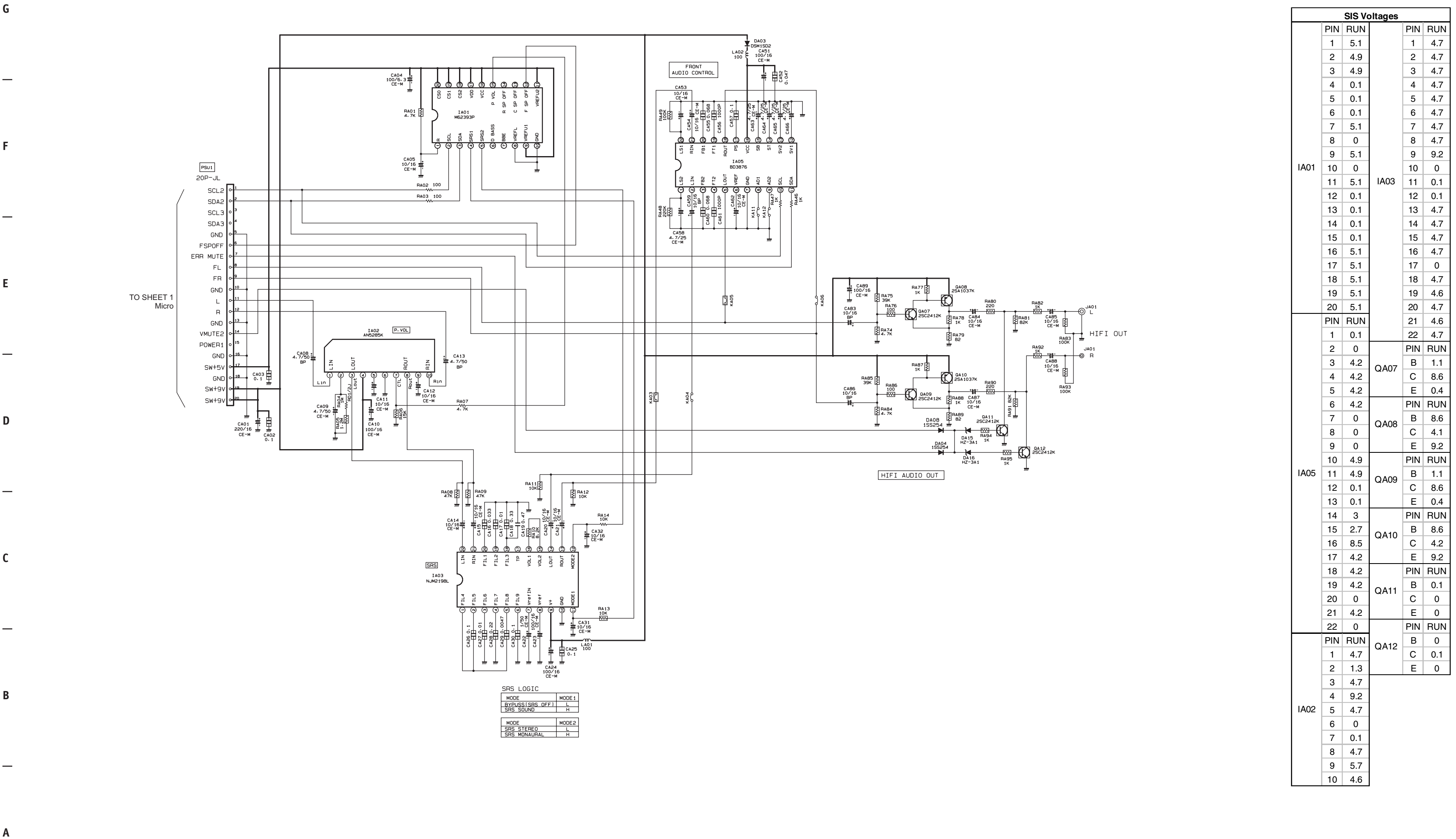
A

Control Panel Voltages		
QM01	PIN	RUN
	B	0.12
	C	0
	E	0
QM02	PIN	RUN
	1	1.5
	2	1.24
	--	--
QM03	PIN	RUN
	B	0
	C	0
	E	0
QM04	PIN	RUN
	B	0
	C	0
	E	0
QM05	PIN	RUN
	B	0
	C	0.8
	E	0



CRITICAL SAFETY COMPONENTS ARE IDENTIFIED BY THE SYMBOL ⚠. REPLACE ONLY WITH PART NUMBERS SPECIFIED.

ZP94/95 Audio Circuit



SIS Voltages					
IA01	PIN	RUN	IA03	PIN	RUN
	1	5.1		1	4.7
	2	4.9		2	4.7
	3	4.9		3	4.7
	4	0.1		4	4.7
	5	0.1		5	4.7
	6	0.1		6	4.7
	7	5.1		7	4.7
	8	0		8	4.7
	9	5.1		9	9.2
	10	0		10	0
	11	5.1		11	0.1
	12	0.1		12	0.1
	13	0.1		13	4.7
	14	0.1		14	4.7
	15	0.1		15	4.7
	16	5.1		16	4.7
	17	5.1		17	0
	18	5.1		18	4.7
	19	5.1		19	4.6
	20	5.1		20	4.7
IA05	PIN	RUN	QA07	21	4.6
	1	0.1		22	4.7
	2	0		PIN	RUN
	3	4.2		B	1.1
	4	4.2		C	8.6
	5	4.2		E	0.4
	6	4.2	QA08	PIN	RUN
	7	0		B	8.6
	8	0		C	4.1
	9	0		E	9.2
	10	4.9	QA09	PIN	RUN
	11	4.9		B	1.1
	12	0.1		C	8.6
	13	0.1		E	0.4
	14	3	QA10	PIN	RUN
	15	2.7		B	8.6
	16	8.5		C	4.2
	17	4.2		E	9.2
	18	4.2	QA11	PIN	RUN
	19	4.2		B	0.1
	20	0		C	0
21	4.2	E		0	
22	0	PIN		RUN	
		B		0	
IA02	PIN	RUN	QA12	C	0.1
	1	4.7		E	0
	2	1.3			
	3	4.7			
	4	9.2			
	5	4.7			
	6	0			
	7	0.1			
	8	4.7			
	9	5.7			
10	4.6				



CRITICAL SAFETY COMPONENTS ARE IDENTIFIED BY THE SYMBOL . REPLACE ONLY WITH PART NUMBERS SPECIFIED.